



## **ALTERNATIVE ACTIVE DUTY MILITARY RETIREMENT PLAN**

**THESIS**

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AFIT/GCA/ENS/11-02

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Wright-Patterson Air Force Base, Ohio

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ALTERNATIVE ACTIVE DUTY MILITARY RETIREMENT PLAN

THESIS

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## Abstract

The purpose of this thesis is to explore the monetary effect of implementing an alternative military retirement system for incoming active duty service members who retire after a minimum of 20 years of service. This alternative system combines elements of both a defined contribution plan and a defined benefit plan. Upon entering the military, all members would have a monthly contribution placed into the Thrift Savings Plan (TSP) on their behalf in exchange for a decreased monthly payment from the government upon retirement. The research model is based on case studies of Air Force members using historical data and Monte Carlo simulation. The results include an in-depth sensitivity analysis on various influential factors such as individual career length, inflation, and TSP rate of return. The research indicates that this alternative system may be able to generate substantial cost savings for the government. In addition, results show a likelihood of equal or increased monetary benefits for military members after retirement. The proposed alternative plan supplies a promising combination of retiree benefits and government savings.

AFIT/GCA/ENS/11-02

This work is dedicated to all the hardworking men and women in uniform, and especially to my husband who is always my rock even from thousands of miles away. Thank you for finding time during both your deployments to help me while I attended AFIT (and all the other deployments while I finished my bachelor's degree).

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Amy Schmidt

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# ALTERNATIVE ACTIVE DUTY MILITARY RETIREMENT PLAN

## I: Introduction

Due to the recent recession, many organizations in the United States have been tightening their belts and discovering innovative ways to save money without decreasing the quality of life for their customers. The federal government is no different, and is faced with some of the same monetary issues as the private sector. Cost-cutting measures have been debated in Congress, and one option is to decrease the annual budget for the Department of Defense (DoD). The DoD operates in a fiscally constrained environment, and prudent spending is necessary to meet all of its objectives. Because military retirement is a large expense for the DoD, seeking to reduce the government cost without decreasing retiree benefits is a worthwhile endeavor.

## Background

The military retirement plan is a strong recruiting and retention tool used by the DoD. In an era where more of the burden of saving for retirement is heavily placed on individuals, the military pension system stands out amongst other options. It is estimated that 46% of officers and 15% of enlisted personnel remain on active duty at least 20 years and are eligible for retirement when they leave the service (Congressional Budget Office, 2007).

Military retirement pay has recently been a hot topic due to its steadily-increasing cost. At the end of fiscal year 2009, 1.47 million non-disabled active duty retirees were receiving pensions at a cost of \$39.5 billion (Department of Defense Office of the Actuary, 2010). Members of the United States military who complete a minimum of 20 years of active duty service are entitled to a lifetime monthly benefit immediately upon retiring from service (Defense Finance and Accounting Service, 2010).

Two schools of thought exist on the cost of that benefit. Some believe that military retirement benefits are too expensive and that there should be a reform to either pay the benefits later or pay a decreased amount. Others believe that trying to maintain an all-volunteer force during a time when the U.S. is engaged in a dual conflict requires a strong incentive to keep individuals for an entire career (Henning, 2006).

There are currently two retirement options for incoming service members: the High-36 plan and the Career Status Bonus (CSB)/Redux plan. Under the High-36 plan, members are paid a monthly sum that is equal to the average of the highest 36 months of basic pay, which are usually the last 36 months of service, multiplied by 2.5% for each year of service. With the CSB/Redux plan, retirees receive a decreased monthly pay percentage in retirement until age 60 in exchange for a one-time payment of \$30,000 after the 15<sup>th</sup> year of service. CSB/Redux retirees receive a lower rate of cost-of-living-adjustment, which will be explained more in-depth in Chapter Two (Defense Finance and Accounting Service, 2010).

An additional source of retirement income is the Thrift Savings Plan (TSP). The TSP is an investment option offered to military members and Federal employees (Thrift Savings Plan, 2010). The fund is similar to a 401(k) in that individuals contribute their

own pre-tax funds that can be withdrawn after they reach a specific age. In most cases, contributions by military members are not matched by any agency.

The purpose of this research was to determine if the DoD could replace the High-36 plan with an alternative system that would decrease costs without reducing benefits to the member. In doing so, various factors were analyzed to build a model. The results of this study indicate that a combined defined contribution and defined benefit plan may generate substantial savings to the government and also satisfy the objective to provide the same level of individual income in retirement.

## **Research Problem**

The purpose of this research was to forecast the monetary outcome of an alternative military retirement plan that combines a defined contribution and a defined benefit to both the government and retirees. The core premise was to discover the effect of a monthly contribution to a Thrift Savings Plan retirement account upon enlistment in exchange for a lower percentage of retirement pay after leaving the military. The desired result consisted of a solution where the government can decrease spending while the retiree breaks even or better on retirement income in comparison to the High-36 method.

## **Methodology**

The overall methodology employed compared the current High-36 retirement system to a proposed replacement system. Data were collected and a set of assumptions were created using Monte Carlo simulation. The assumptions were then entered into a model to predict the outcome employing the new system. Three general categories of

examples were created using simulated factors that are deemed to be likely scenarios based on current Air Force demographics. All cases involve members retiring after at least 20 years of active duty service, and are categorized as an enlisted member, an officer, and a prior-enlisted officer.

## **Scope and Limitations**

This research outlines an alternative retirement plan to replace the current High-36 plan for active duty members. The findings do not address policy implications, effects on retention, or tax issues. Due to the lack of availability of promotion information, the case studies were all conducted using simulated Air Force members. Although the results are expected to be similar for all branches of the military, no extrapolation to the entire Department of Defense was made.

The analysis was based solely on historical data. As all investors are anecdotally warned, past performance of any type of fund does not predict the future performance of that fund. The same warning can be applied to almost every aspect of this research to include the TSP return, inflation rate, military pay raise percentage, cost of living adjustment, and life expectancy. The results could be distorted in the wake of a significant economic event. Sensitivity analysis was conducted to explore some of the most likely possible scenarios.

## **Review of Chapters**

Chapter Two contains a literature review of military and civilian retirement plans as well as a compilation of previous work on proposed military retirement changes. It

outlines the most common types of retirement systems available in the United States and any necessary history pertaining to this topic. The literature review also provides a useful contextual background with which to compare the utility of a new retirement system.

The overall model structure and specific methodology employed comprise the majority of Chapter Three. The various model inputs and applicable factors, including any necessary manipulations and simulations, are detailed. Further information regarding the data collection and related assumptions is fully explained.

Chapter Four provides an in-depth breakdown of the findings. The results of the model calculations are described alongside the sensitivity analyses performed on the original model outcomes. Pertinent results of the sensitivity analyses are included to highlight the relevance of several individual factors to the overall results. Additionally, the chapter provides insight as to how the results of the various models may be compared and contrasted to one another.

Chapter Five summarizes the research and discusses possible outcomes for both the government and service members. The information in this chapter provides decision makers with the necessary tools to consider replacing or adding an option to the military retirement system. Strengths and limitations of the research are provided for further clarification.

## **II. Literature Review**

The literature review focuses on relevant background for the decision maker. The section begins with the current and historic military retirement systems and continues to recently proposed changes. The chapter also includes pertinent information regarding the Thrift Savings Plan, Individual Retirement Accounts (IRAs), Social Security, federal retirement systems, and civilian pension plans.

### **Active Duty Military Retirement Plans**

Service members who began active duty service on or after August 1<sup>st</sup>, 1986 have the option to choose between two different retirement plans, the Redux and the High-36 plans, at the 15 year point in service. Under both systems, members must complete at least 20 years of service (YOS) before benefits begin. The government provides a monthly payment upon retirement for the remainder of the service member's life.

The most frequently chosen option, High-36, is a fairly straightforward payment method. Each month a percentage of the average of the highest 36 months of basic pay is paid to a retired member. 20 years of active duty service entitles the retiree to receive 50% of the computed average. The retiree will receive an additional 2.5% of the computed monthly average for each year served above 20. After retirement, monthly payments are adjusted annually through cost of living adjustments in direct response to the previous year's inflation as determined by the Consumer Price Index (CPI) for Urban Wage Earners and Clerical Workers (Department of Defense, 2010).

The second option currently available, commonly referred to as Redux, was instituted as a result of the Military Retirement Reform Act of 1986. Retired members are eligible to receive 40% of the average monthly basic pay of the highest 36 months of basic pay each month at the 20-year service point. For each year of service after the 20<sup>th</sup>, the monthly percentage increases by 3.5% until it reaches a total of 75% at year 30. At this point, the percentage increase is equal to the High-36 option at 2.5% per additional year. Appendix B contains a table depicting the differences in percentages.

The Strom Thurman National Defense Authorization Act (NDAA) for Fiscal Year 1999 repealed compulsory enrollment of the Redux option and added the Career Status Bonus (CSB) to the Redux system created in 1986 to encourage a higher level of participation in the program (United States Congress, 2006). In addition to the monthly retirement payments previously established by Redux, members are paid a lump sum of \$30,000 at the 15-year point in their careers with the agreement to serve at least 20 years. If a member separates from the service before the 20-year point, a prorated portion of the bonus must be repaid and no monthly retirement benefit is paid.

Redux has a unique characteristic in that the percentage of monthly benefits increases to match the percentages of High-36 at age 62. The annual cost of living adjustment (COLA) is 1% less than the adjustment for retirees receiving payment under the High-36 option. There is a one-time catch-up COLA at age 62 and then it returns to 1% below the COLA each year (Defense Finance and Accounting Service, 2010).

Until 2007, the maximum time in service was limited to 30 years in most cases, which in essence created a 75% ceiling (United States Congress, 2006). Due to the strain on the current force, the John Warner NDAA extended the cap to 40 years under ordinary

circumstances. Although few individuals will be allowed to serve the maximum 40 years, it is now possible for a member to receive 100% of the computed average of basic pay as of the date of this thesis (Henning, 2008). Both plans now pay an additional 2.5% of the average of the highest 36 months of pay for each year of service over 30.

According to a 2001 article in the Financial Services Review, “only those who expect long military careers (e.g., 28 years or longer), senior ranks (e.g., to Colonel or General), and/or high real returns (e.g., greater than 8%) should remain under Redux” (Jennings and Reichenstein, 2001). Because the percentage of monthly retirement income approaches the percentages of the High-36 plan, longer careers may cause less loss of income after retirement. However, by ignoring the importance of future value streams, retirees could potentially cause great detriment to their income after retirement by making poor choices about which retirement option to receive.

Opponents of the Military Reform Act of 1986 have conducted studies to compare the effects of the reduced benefits. Even after the addition of the \$30,000 bonus in 2000, military studies challenge that accepting CSB/Redux over High-36 generates lower income in retirement. The Center for Naval Analyses accomplished a study to determine the differences between CSB/Redux and High-36 pay, and likened the bonus to a loan against future cash flows. The researchers found that in most cases, even when the CSB is immediately invested, accepting the Redux option leads to lower overall earnings in retirement. For example, an E-7 retiring at 20 YOS at 38 years of age would have to make 17.1% annual returns on the invested bonus to equal the amount of income lost. They also pointed out that as each year passes, Redux becomes a less attractive option because the \$30,000 CSB is not adjusted for inflation and reported that, “the *additional*

reduction in retirement income under Redux for those making the choice in 2010 (versus 2001) is over \$100,000 for virtually all retirees” (Quester et al., 2010.)

Although military retirement is a goal for some career-minded individuals, the majority of service members do not remain on active duty for 20 years. If a member separates before 20 years under normal circumstances, he or she is not entitled to any retirement payment. The Congressional Budget Office estimates that only 15% of enlisted troops and 46% of officers remain on active duty until retirement (2007). These percentages do not include members who choose to leave active duty to join a National Guard or Reserve unit. Guard and Reserve retirees are entitled to retirement pay upon reaching age 60, once they have completed the necessary number of years and duty days. Since this research explicitly focuses on the effects of an alternative system to active duty service members, National Guard and Reserve retirement pay was not examined.

The size of the active duty military has shrunk since the end of the Cold War. In 2010, there were 165,291 recruits who entered the military. Table 1 shows the breakout of military recruits by branch of service (Department of Defense, 2010). Only 30% of Americans from the ages of 17 to 24 are qualified to join the military due to physical, educational, or moral requirements, and the DoD must find creative ways to entice them to join the service instead of taking private sector jobs (United States Department of Defense, 2010).

**Table 1. FY2010 Military Recruitment (U.S. Department of Defense, 2010)**

<b>Branch</b>	<b>Recruiting Goal</b>	<b>Number of Recruits</b>
Air Force	28,360	28,493
Army	74,500	74,577
Marine Corps	28,000	28,041
Navy	34,140	34,180
<b>Total</b>	<b>165,000</b>	<b>165,291</b>

Retirement benefits are important recruiting and retention tools. Military members are not covered by the Employee Retirement Income Security Act of 1974 that governs civilian pensions and mandates that full vesting occurs after only a few years, and often stay on active duty longer than originally planned simply to attain retirement benefits (Asch, Hosek, Mattock, and Panis, 2008). Although retiree benefits take away money that some feel should actively be spent on defense, out of a \$450 billion budget, “these benefits are not significant enough to really detract from current defense capability” (Henning, 2006.) Research on the history of military retirement indicates that retiree benefits have always been passionately debated.

### **History of Military Retirement**

The first mention of a military pension system was in 1624 by Governor Sir Francis Wyatt of Virginia. He proposed a law to mandate that those wounded during service be compensated with public funds. The law was passed by the general assembly of Virginia, but was never ratified in England. The first enacted law was in 1636 by the Pilgrims and required that anyone wounded during compulsory service be taken care of by the colony for the remainder of his life (Glasson, 1918).

In years to follow, the colonies adopted various laws that were similar in nature. During the Revolutionary War, Congress was petitioned to provide not only payment for those injured in battle, but an ongoing payment for life to any officer who remained in service until the end of the war. As a result, the first national pension law came into existence on August 26, 1776. The law stipulated that those injured so grievously as to not be able to maintain a household would receive half pay for the remainder of their lives. An interesting aspect of that law was the creation of a corps of invalids, which allowed soldiers who were able to perform garrison duties to stay in service and receive full pay (Glasson, 1918).

Congress recognized that the pension system was a recruiting and retention tool, but was reluctant to pass the laws for fear of creating a privileged class of retirees similar to retired British Army officers. President George Washington was a strong proponent of the pension and advocated vehemently on its behalf. After four years of debate, the second part of the petition, which promised half pay for life to retired officers and a set monthly stipend for enlisted soldiers, was adopted October 21, 1780 (Glasson, 1918).

Congress established a Pension Office on March 2, 1833, and a Commissioner of Pensions, James L. Edwards, was appointed. He immediately reported widespread fraud of the existing system and recommended that all states review their applications. The expenditures were larger than expected and drew national attention. Due to the passage of the pension to surviving widows, over 100 widows remained on the payroll in 1916, 11 years after the last veteran of the War of 1812 passed away (Glasson, 1918).

The payments increased steadily, rising from \$29 million in expenditures in 1870 to \$160 million by 1910 excluding administrative expenses. The expenditures created a

deficit that was covered by the sale of Treasury bonds (Glasson, 1918). Although much argument ensued and many changes were made to the disability portion of the pension laws, the half pension for life has been instituted off-and-on for over 200 years and is still the standard.

During the Civil War, the pension system was solidified to the point that most officers received payments immediately after service. The formal plan instituted in 1861 entitled officers to voluntarily retire after they completed 40 YOS and changed to 30 YOS for Army and Marine Corps officers in 1870. Beginning in 1885, enlisted members were eligible for retirement after 30 YOS. In later years, the mandated term of service before retirement decreased incrementally until a low of 15 years of service was reached for Army officers between 1935 and 1948. It was subsequently increased in the late 1940s to 20 YOS for all branches of service and has not changed since (Christian, 2006).

Because of the generous system that guaranteed income to soldiers as well as widows, the pensions “attracted young wives to elderly veterans whose pensions they could inherit as the widow of a war veteran.” As a result, payments to Civil War widows continued until 1999. The Civil War pension plan is considered to be the precursor to the modern current Social Security system used in the United States (Social Security Administration, 2011).

The military retirement system has remained largely unchanged since just after World War II. The basic tenet that retirees receive lifetime payments immediately upon retirement after serving at least 20 years has not been altered. According to Asch and Warner, the chief complaints are that, “the system is excessively costly and unfair to

taxpayers, unfair to the majority of military entrants who do not serve long enough to receive retirement benefits, inefficient, and inflexible” (1994). The prior internal method of retirement accounting could also be labeled as inefficient and inflexible.

The Department of Defense has not always been prudent about its accounting practices, and did not begin using an accrual method of retirement accounting until it was mandated by Congress in 1984. Prior to that, it recorded retirement expenditures in the year they occurred, which caused difficulty in predicting future costs, especially since costs were not realized until at least 20 years after an individual joined the military. The lack of predictive ability led the DoD to make decisions based on a shortage of useful information or poor assumptions. The new accrual system implemented in 1984 assisted in improving its performance in that regard (Eisenman et al., 2001). Annual accrual payments are made into the Military Retirement Fund and equal approximately \$10,000 per service member (Congressional Budget Office, 2007).

The Military Retirement Reform Act of 1986 (Redux) was enacted to diminish retirement expenditures. The act was focused on the savings and did not fully take the recruiting and retention implications into consideration. An Air Force sponsored study was conducted by the RAND Corporation soon after that warned in bold print, “losses of personnel due to the new retirement system are likely to be much larger than expected” (Argüden, 1987.) Despite the strong warning, compulsory Redux participation was not repealed until 1999 (United States Congress, 2006.)

## **Proposed Military Retirement Changes**

Military retirement plans have a profound effect on retention rates, which corresponds with their original intent. In order to maintain a balanced force, the DoD constantly assesses its goals to attract and retain an adequate labor pool. Multiple studies have been conducted to determine the effect of various military retirement plans although little has actually changed. The main issues which compel agencies to attempt to transform the retirement plans are cost, equity, selective retention, civilian comparability, and force management flexibility (Christian, 2006).

In past years, there has been scrutiny of the High-36 and CSB/Redux plans and it is widely believed that the current systems which require members to serve at least 20 years before they receive any benefits is, “inequitable, inflexible, and inefficient” (Department of Defense, 2010). Some options being considered are providing additional pays at specified intervals during a person’s career, paying separation bonuses, and vesting earlier than 20 years. Changes to the current systems would allow for more flexibility for force shaping and compensate members for the length of their service without forcing them to complete a career to receive any additional compensation. It would also provide the government with the ability to have the right mix of employees instead of retaining unproductive members who only remain in the service to earn military retirement.

While Redux was still the compulsory retirement system, RAND conducted a study indicating that providing an annuity at a later age in life for retirees who separate before 20 years of service would not affect retention. Additionally, the predicted effect is that it would ultimately only increase the retirement costs with no added benefit (Asch

and Warner, 1994). Despite the best efforts to control retention and recruitment through government programs, high retention or separation rates are affected by outside factors such as the economy and civilian job market (Asch, Johnson, and Warner, 1998).

In April 2006, the Defense Advisory Commission on Military Compensation made a suggestion previously considered by the President's Commission on Military Compensation in 1998, to postpone retirement age to 60. This would decrease government costs substantially. As an offset, both commissions also recommended a 5% government contribution into a fund such as the TSP for active duty members (Federal Research Division, Library of Congress, 2007). Neither of these ideas was adopted.

The Quadrennial Review of Military Compensation (QRMC) is mandated by law to occur every four years to assess the value and effectiveness of all military benefits. The report is ultimately reviewed by the President, who then provides it to Congress so it can determine whether more research should be conducted to make changes. The most recent review, initiated in 2005, was released in 2008 (Henning, 2008). RAND was sponsored to perform an analysis of the options generated by the 10<sup>th</sup> QRMC. Because the QRMC suggestions have not yet been vetoed or implemented, the proposed options and RAND analyses are discussed in more detail. The latest proposal includes the following (Department of Defense, 2008):

- Vesting after only 10 years of service and retirement payments equal to 2.5% for each month of the highest 36 months of basic pay beginning at age 57
- An option to begin accepting payments prior to age 57 in exchange for a payment reduced by 5% points for each year before 57

- A 5% defined contribution to an account with rules similar to a 401(k) plan fully vested at 10 years
- “Gate pay” bonuses at specific points in service
- Separation pay after retirement for individuals who serve at least 20 years

The RAND analysis of the options indicated that the proposed changes may be able to achieve the aforementioned goals of the 10<sup>th</sup> QRMC. The benefits for members who serve at least 10 years but less than 20 years compel service members to separate earlier. With the assumptions built into the research model, members separating at 20 years (but not later, which would cause a negative effect on longer career lengths) would have greater monetary benefits, the government would be able to save money overall, and the force could be more flexibly managed (Asch, Hosek, Mattock, and Panis, 2008).

## **The Thrift Savings Plan**

The Thrift Savings Plan (TSP) was created as a result of the Federal Employees’ Retirement System Act of 1986. The TSP has several funds in which investors can contribute. The individual funds are the Government Securities Investment (G) Fund, Fixed Income Investment (F) Fund, Common Stock Investment (C) Fund, Small Capitalization Stock Index (S) Fund, and the International Stock Index (I) Fund. The remaining funds are the Lifecycle (L) Funds, which are a predetermined blend of the five individual funds based on an investor’s projected retirement date (TSP, 2010).

The available Lifecycle Funds are the L Income, L 2020, L 2030, L 2040 and L 2050, with the numbers after the L indicating the year of anticipated retirement. The L Income Fund is for those who are currently receiving income through monthly

withdrawals from their TSP accounts. The goal of the L Income Fund is to preserve the account balance, therefore the majority of remaining funds are invested in the G Fund, which is protected and guaranteed by the U.S. Government (TSP, 2010). With the exception of the L Income Fund, the L Funds are adjusted quarterly to adjust for changing risk in accordance with nearing the target retirement date. As the retirement date nears, more of the fund assets are allocated to the G Fund. The L Funds are rebalanced each day to preserve the targeted allocation of resources (TSP, 2010).

The individual TSP funds are managed by the Federal Retirement Thrift Investment Board and BlackRock Institutional Trust Company. The L Funds each have a specific goal in regards to emulating the returns of other outside funds. The F Fund attempts to mirror the Barclays Capital U.S. Aggregate Bond Index. The C Fund returns are consistent with the Standard and Poor's 500 (S&P 500) Index. The S Fund is on par with the Dow Jones U.S. Completion Total Stock Market Index. The goal of the I Fund is to match the returns of the Morgan Stanley Capital International EAFE (Europe, Australasia, Far East) Index (TSP, 2010).

Legislation has been enacted to update several aspects of the TSP. One of the more notable changes from the Thrift Savings Plan Enhancement Act of 2009 is that permission was granted to the Federal Retirement Thrift Investment Board to include mutual funds in the mix of current TSP options. Another important portion of the signed bill was the Secretary of Defense's direction to provide Congress with a report regarding recruiting and retention changes if the DoD decided to match the TSP contributions of military members (United States Congress, 2009). If the DoD ultimately adopts the

policy to match service member contributions, the portion of this research displaying the growth of retirement accounts would be relevant.

The Lifecycle (L) Funds have only been available to investors since August 1<sup>st</sup>, 2005; therefore, there are fewer historical performance data for the L Fund than for individual funds. The original L Fund options included L 2010, which closed December 31<sup>st</sup>, 2010. In July 2010, the remaining funds in the L 2010 were rolled into the L Income Fund. The L 2050 Fund is new as of January 1<sup>st</sup>, 2011.

The majority of actively employed government employees are eligible to contribute to various funds in the TSP. Although there is a penalty, contributors to the TSP are able to withdraw funds before retirement, which is not an available option with the direct military pension. As a contrast, it is important to mention the main types of retirement options available to citizens in the United States. Most Americans receive retirement income from Social Security, personal 401(k) accounts, or pensions from private employers.

## **Federal Employee Retirement**

Federal employees who started working for the government in 1983 or later fall under the umbrella of the Federal Employee Retirement System (FERS), which replaced the Civil Service Retirement System (CSRS) in 1987. There are three prongs to the FERS. The first is the Social Security system, which is covered in greater detail in a subsequent section. The second is the defined benefit plan which includes mandatory payments into the system by the employees. The third is the eligibility to contribute to the TSP. In most cases, the agency makes a matching or non-matching contribution to

the accounts of participating individuals. As of June 22, 2009, federal employees who fall under the FERS are automatically enrolled in the TSP upon being hired (TSP, 2010). Military retirees may convert their retirement into the FERS if they meet certain criteria (United States Office of Personnel Management, 2010).

### **Private Pension Plans**

Private pension plans were not widely available until the 20<sup>th</sup> century. The roots can be traced back to the Alfred Dolge Company in 1882. Mr. Dolge placed one percent of each employee's pay into a pension account and paid six percent interest annual interest on the account. His belief was, "that just as his company had to provide for the depreciation of its machinery, he should also 'provide for the depreciation of his employees.'" Although his intent was admirable, it was only beneficial to employees who maintained employment with his company. Due to labor mobility and the fact that only five US companies provided private pension plans by 1900, it was not a commonly expected benefit (Social Security Administration, 2011).

Traditional defined benefit pension plans by private employers are less common than they were just a few years ago. With the popularity of individually based retirement plans, it is more widespread for a company to offer a defined contribution plan. According to the 2008 National Study of Employers, 76% of companies provide a defined contribution pension plan but only 26% have a defined benefit plan (Galinsky et al., 2008).

A defined benefit plan provides a specific dollar amount in retirement based on pre-determined factors. A defined contribution plan provides a specific percentage

without the guarantee of a certain amount of retirement income. The most popular outlet for the employer contributions is a 401(k) account. However, defined contribution plans also encompass 403(b) plans, employee stock ownership plans, and profit-sharing plans, which will not be discussed in-depth in this research (United States Department of Labor, 2010). The decrease in availability of defined benefit plans in the private sector serves only to enhance the desirability of either of the existing military retirement systems.

### **401(k)**

American workers are increasingly investing in private 401(k) plans to provide income during retirement. As defined by the Internal Revenue Service, a “401(k) plan is a type of tax-qualified deferred compensation plan in which an employee can elect to have the employer contribute a portion of his or her cash wages to the plan on a pretax basis” (Internal Revenue Service, 2010). The most attractive features of the 401(k) are the workers’ ability to control their retirement investments and receive a tax break on the contributions during working years when individual income is likely to be higher. Similar to the rules of the TSP, retirees are able to withdraw funds if necessary. The large drawback of the 401(k) is that withdrawals during ordinary circumstances cannot be made until age 59 ½ without penalty (Internal Revenue Service, 2010).

### **Social Security**

President Theodore Roosevelt suggested a system of social insurance in 1912 that was modeled on the programs of several European nations. Although it was not adopted at that time, the idea remained implanted in the minds of others. In the wake of the

Depression, Americans were rightfully worried about their long-term welfare. President Franklin D. Roosevelt enacted the Social Security Act on August 14, 1935. The first payments were made in lump sum, but soon expanded to monthly payments in 1940. Workers have made contributions to the current system since 1937 (Social Security Administration, 2011).

Concern is growing amongst younger Americans that Social Security benefits might not be available when they retire. During a speech to the National Commission on Fiscal Responsibility and Reform in April 2010, Mr. Ben Bernanke declared that the growth of workers available to contribute to Social Security is less than the increase of individuals eligible for benefits and stated, “the fiscal imbalances associated with the Social Security system are...significant and thus present an important challenge for policy” (Bernanke, 2010).

The potential lack of Social Security is disconcerting, especially for lower-income workers, for whom, “Social Security benefits replace up to 90 percent of their pretax working years’ income” (Carlson, 2005). In a recent report from the Board of Trustees, benefits are currently projected to be exhausted in 2037. In addition, it released the following expectation of income and costs:

“The cost rate...falls below the income rate in 2012 through 2014 as the economy recovers, then rises above the income rate again beginning in 2015. After 2015, the difference between the cost rate and the income rate grows rapidly through 2035. Tax revenues are projected to be sufficient to support expenditures at a level of 78 percent of scheduled benefits after trust fund exhaustion in 2037, declining to 75 percent of scheduled benefits in 2084” (Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, 2010).

The shortage of Social Security funding is not the only concern for retirees. The full retirement age has been steadily creeping upward to adjust for the increased cost and the longer life expectancy for retirees. For Americans born in 1960 or later, the full retirement age is 67, and they cannot even opt to receive reduced benefits until after age 62. That leaves a crucial income gap between retirement and the time full Social Security payments can be started for some retirees (Social Security Administration, 2011).

Based on the possible scenario of Social Security not being available in future years, Americans are increasingly aware they must proactively prepare for their own retirement incomes. Several methods of saving for retirement exist ranging from employer-paid plans to Individual Retirement Accounts (IRAs). The burden of providing income after retirement is slowly shifting from employers to the employees.

Military members currently have a defined benefit plan upon retirement coupled with an individual TSP account if they contributed to the program during their time in service. Most military retirees are also eligible to receive full Social Security benefits as supplementary income (Social Security Administration, 2011). The combined income is a large incentive to remain in the military at least 20 years.

### **III. Methodology**

This chapter describes the methodology employed for the model of the proposed alternative retirement plan. The data and collection details are specified along with the use of individual case studies and model design. The objective of this research is to create a new retirement model as a possible replacement for the High-36 plan presently in use; therefore, this alternative model employs a comparison of costs and savings for the government and retirees to the High-36 method.

#### **Proposed Plan**

The overall structure of the model is to ascertain the effect of a government contribution to the Thrift Savings Plan (TSP) combined with a decreased defined retirement benefit. Numerous factors were examined to determine the optimum percentages for the government contribution and retirement benefit decrease. In all of the models, the government contribution to the TSP equals 7.5% of each member's monthly basic pay. In exchange, once each member retires, he or she will receive a 10% reduction in the retirement payment calculated under the High-36 method. For example, a person retiring after 20 years of service is now eligible to receive 50% of the average of the 36 highest months of basic pay. With this proposed model, the member would receive 90% of that amount, in essence 45% of the average of the 36 highest months of pay. Likewise, any person retiring after 30 years would receive 90% of the High-36 calculated pay, which is 67.5% of the average of the 36 highest months of basic pay. Table 2 illustrates the modeled pay percentages.

**Table 2. Proposed Model Percentages vs. High-36 Retirement Plan Percentages**

<b>Years of Service</b>	<b>Proposed Model</b>	<b>High-36 Plan</b>
20	45.00%	50.00%
21	47.25%	52.50%
22	49.50%	55.00%
23	51.75%	57.50%
24	54.00%	60.00%
25	56.25%	62.50%
26	58.50%	65.00%
27	60.75%	67.50%
28	63.00%	70.00%
29	65.25%	72.50%
30	67.50%	75.00%
31	69.75%	77.50%
32	72.00%	80.00%
33	74.25%	82.50%
34	76.50%	85.00%
35	78.75%	87.50%
36	81.00%	90.00%
37	83.25%	92.50%
38	85.50%	95.00%
39	87.75%	97.50%
40	90.00%	100.00%

## Data

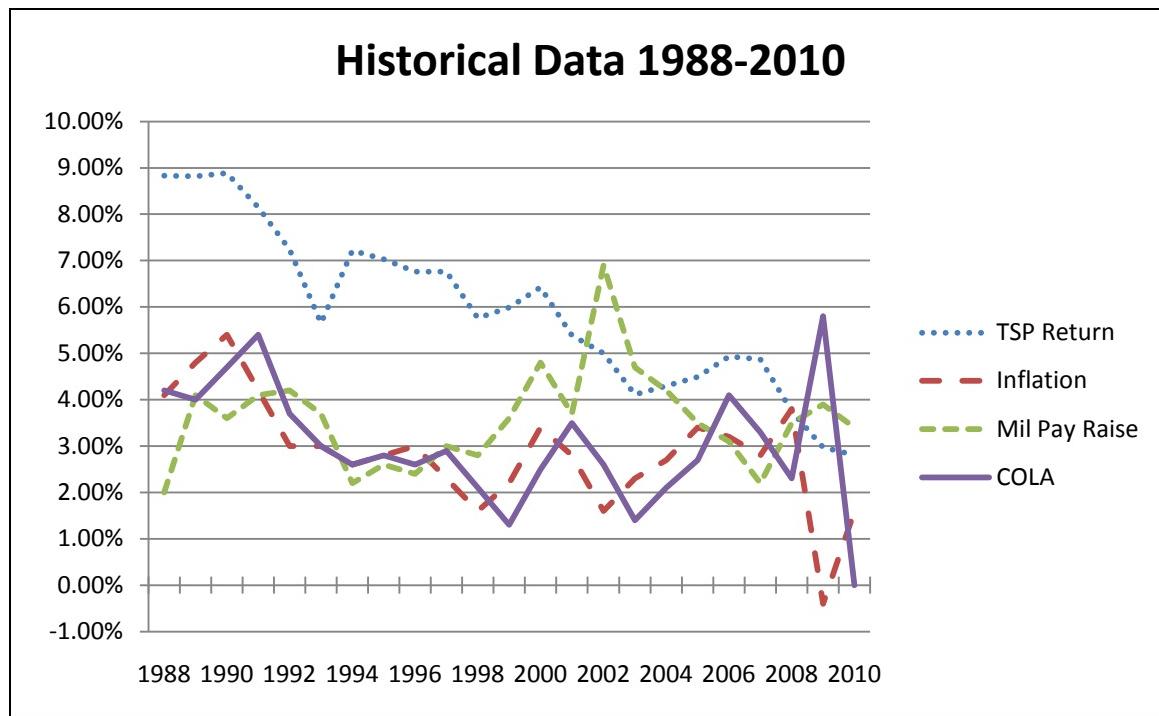
Data were collected from multiple sources for this analysis. Historical data were first gathered and analyzed for appropriateness in the model. Demographics and statistics were obtained from the Air Force Personnel Center (AFPC) to assist with the task of building case studies that accurately depict active duty Air Force personnel. Information from the AFPC Report Builder was compiled and used to determine the average age and rank at enlistment (2010).

The historical inflation rates, shown in Appendix A, were retrieved from the Bureau of Labor Statistics (2011). To keep uniformity of the historical information, inflation data were analyzed from 1988 until 2010, which is the full time period that Thrift Savings Plan G Fund returns are available (TSP, 2011). Including inflation data from only 1988 and beyond also removes the temporary instability of the economy due to the stock market crash in October of 1987.

All information pertaining to the TSP rates of return was obtained from the TSP website (2011). To determine the average annual TSP return, the monthly rates were compiled from the site from the first full year of inception in 1988 through the end of 2010. Annual G Fund returns are available in Appendix A. Due to the volatility of the other funds, only the G Fund was considered as a feasible option for the government to use as an investment vehicle. The G Fund is the only individual fund that is guaranteed to preserve assets in any given time period because it is invested in a short-term U.S. Treasury security (TSP, 2010). The inherent risk of the fund is that the rate of return on the Treasury securities will not surpass the inflation rate.

Military pay percentage raises, displayed in Appendix A, were retrieved from the Department of Defense Comptroller website (2011). Historical Cost of Living Adjustments (COLA) were obtained from the U.S. Office of Personnel Management and are included in Appendix A (2010). The rates for military retirement COLA mirror the rate increases for Social Security as well (Social Security Administration, 2010). The 2011 military pay chart, available in Appendix B, was obtained from the Defense Finance and Accounting Service (2011).

Due to the similar financial nature of the figures, a positive correlation exists between the factors of inflation rate, TSP return, and COLA. In recent years, the Department of Defense (DoD) has made a concerted effort to raise the level of military pay to that of civilian equivalents. From 2000 until 2006, basic military pay rose by 0.5% more than equivalent civilian wages as a product of the National Defense Authorization Act (Congressional Budget Office, 2007). As a result, the annual pay increases do not necessarily coincide with the other factors. Figure 1 depicts the various rates and relationships graphically.



**Figure 1. Historical Data 1988 - 2010**

Life expectancy figures were also acquired during the data collection process. According to the U.S. Census Bureau, the life expectancy at birth in 1988 was 71.4 for

men and 78.3 for women. The average life expectancy at birth for men born in 1990 was 71.8 years and 78.8 for women (United States Census Bureau, 2010). In actuality, the life expectancy for military retirees is anticipated to be longer due to the fact that the above statistics include death probabilities before retirement age. Anyone who has already reached retirement age has a higher chance of living past the average life expectancy at birth (Arias, 2010).

### **Individual Case Studies**

In order to assess the viability of a new system, three individual Air Force case studies were created to encompass all service categories. The three simulated examples consist of an enlisted member, an officer, and a prior-enlisted officer, with ages and ranks at enlistment based upon the averages as reported at the end of fiscal year 2010 by the Air Force Personnel Center (AFPC, 2010). Enlisted and officer applicants must be at least 17 years of age before joining, but due to the educational requirements of officers, non-prior service officers are typically at least 21-years-old (United States Air Force, 2009). Approximately 84% of the total active duty force is comprised of enlisted personnel and the remainder is officers (Department of Defense, Office of the Under Secretary of Defense for Personnel and Readiness, 2010).

For the purpose of calculating the sensitivity effect of withdrawal from TSP beginning at age 59 ½, the model assumes the simulated officer entered the service at age 23 and the enlisted and prior enlisted service members entered at age 21. Based on fiscal year 2010 Air Force demographics for the purpose of the models, it was assumed that the enlisted individual joined as an E-1, the officer entered service as an O-1, and the prior

enlisted officer began service as an E-3. E-3 was used as the starting pay grade for the prior enlisted officer factored on the Air Force entrance data (AFPC, 2010).

The prior enlisted model was based on a likely Air Force scenario, but not strict averages. Prior enlisted careers represent a relatively small percentage of the overall DoD manning and can differ greatly from one person to another. The prior enlisted model was ultimately included for the purpose of sensitivity and contrast. Enlisted promotions at the beginning of the career occurred on the same timeline as the regular enlisted model. The individual became a commissioned officer at the four year point in service and followed the promotion progression of the regular officer model. The promotion schedules for all three cases are depicted in Tables 3, 4, and 5.

**Table 3. Enlisted Model Promotion Assumptions**

Enlisted Promotion	Time in Grade	Time in Service
To Next Rank	Months	Total Months
E-1	0.00	0.00
E-2	0.50	0.50
E-3	0.83	1.33
E-4	1.67	3.00
E-5	1.42	4.42
E-6	8.33	12.75
E-7	4.08	16.83
E-8	2.83	19.67
E-9	2.42	22.08

**Table 4. Officer Model Promotion Assumptions**

Officer Promotion	Time in Grade	Time in Service
To Next Rank	Months	Total Months
O-1	0.00	0.00
O-2	2.00	2.00
O-3	2.00	4.00
O-4	5.00	9.00
O-5	6.00	15.00
O-6	6.00	21.00

**Table 5. Prior Enlisted Model Promotion Assumptions**

Prior Enlisted Promotion	Time in Grade	Time in Service
To Next Rank	Months	Total Months
E-3	0.00	0.00
E-4	1.83	1.83
O-1	2.17	4.00
O-2	2.00	6.00
O-3	2.00	8.00
O-4	5.00	13.00
O-5	6.00	19.00
O-6	6.00	25.00

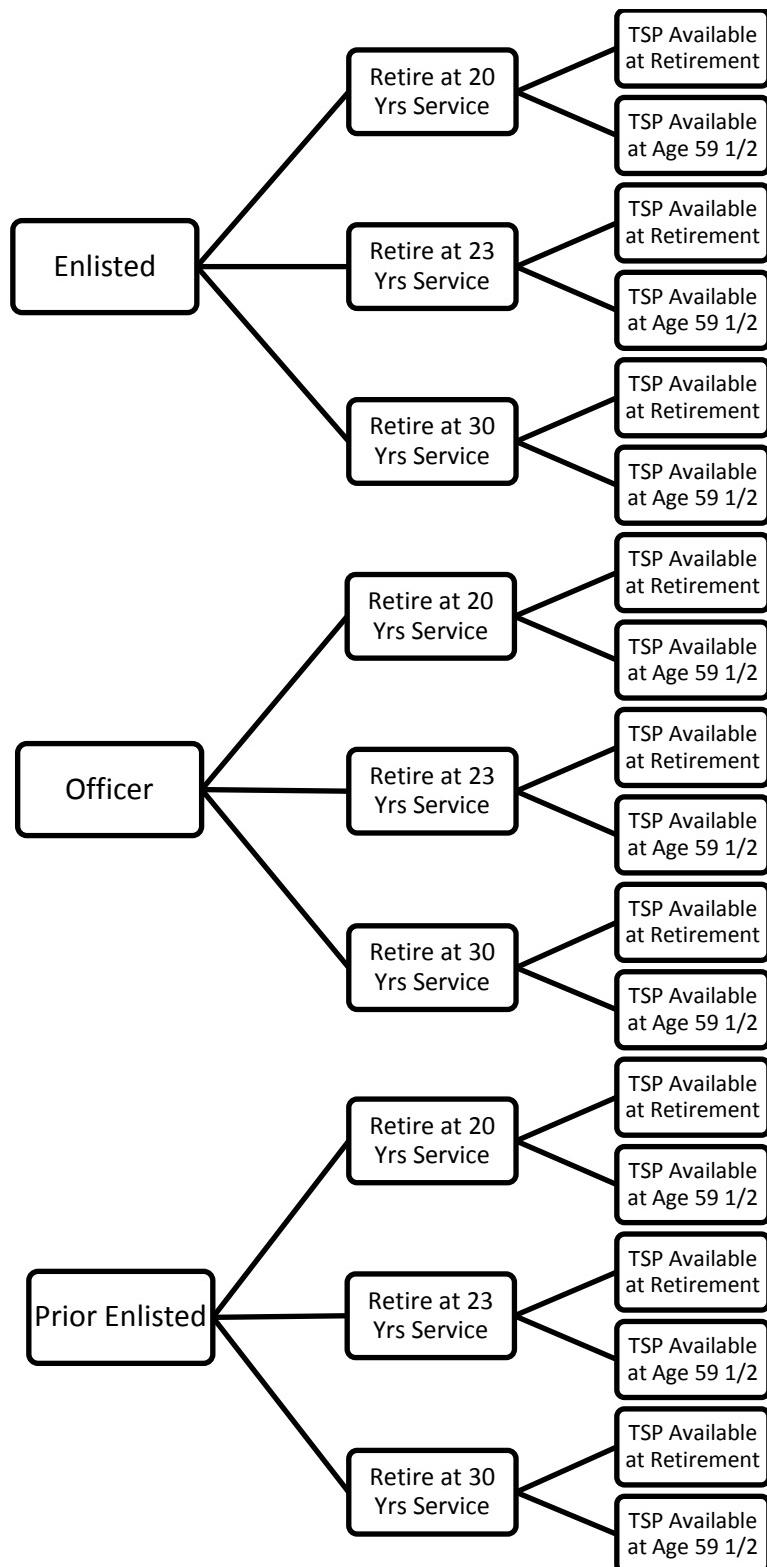
Officer promotions were based on averages calculated from 2010 Air Force Personnel Center data (AFPC, 2010) and in accordance with Air Force Instruction (AFI) 36-2501 (Department of the Air Force, 2004). Enlisted promotions were based on AFPC data and AFI 36-2502 (Department of the Air Force, 2002). These assumptions are deemed appropriate for the majority of military members based on demographics.

The process of frocking is used sometimes in the military but rarely occurs in the Air Force. Frocking is “an administrative authorization to assume the title and wear the

uniform of a higher paygrade without entitlement to the pay and allowances of that grade” (Navy Personnel Command, 2005). Frocked members are not entitled to the pay or legal authority of the higher rank. Because this research focuses solely on the monetary benefits aspect of military service, frocking does not have any bearing on the calculations.

The individual model structure is included in Figure 2 and shows the growth from three basic models to 18 working models. The three basic models (enlisted, officer, and prior enlisted) were expanded upon to determine if the length of service changed the overall results. For testing purposes, the models were built with individuals retiring at 20, 23, and 30 years.

Twenty years was chosen as a focal point because more service members retire after 20 years than any other service length. Although many retire as soon as they are eligible, the mean time in service before retirement is 23 years, which is the reasoning behind modeling at 23 years (Department of Defense, 2010). Thirty years was selected to explore the extreme value that members are normally allowed to serve outside special circumstances. As an additional expansion, all of the models were adapted to test the result of waiting until age 59 ½ to access the TSP account. The branching of the scenarios in essence created 18 basic operational models in which to vary the rates of inflation, TSP return, military pay raises, and retiree cost of living adjustments.



**Figure 2. Model Structure**

## **Model Design**

A static set of values for use in the individual scenarios were generated using Monte Carlo simulation with the *Palisades Corporation @Risk* software. The factors inflation rate, TSP G Fund return, retiree cost of living adjustment (COLA), and the percentage of military pay raise were first simulated and then later varied during the sensitivity analysis. The intent was not to pull purely random samples, but to develop cases that are likely to occur in the Air Force based on background information. Although every effort was made to create realistic cases, personnel data may not mirror the mean in every instance. Unfettered access to AFPC databases would increase the likelihood of approaching the mean.

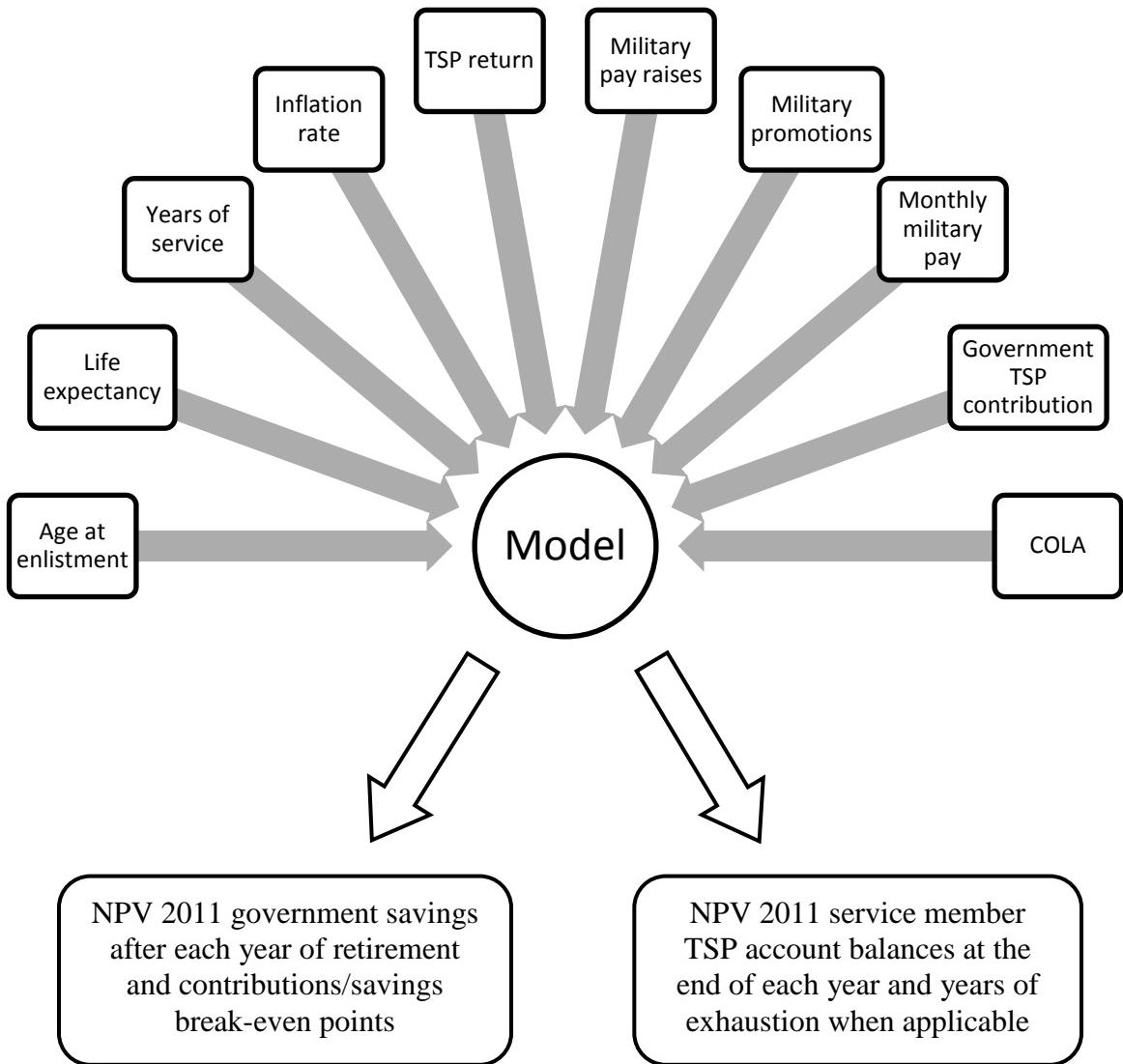
The historical military pay raise, inflation, TSP return, and COLA percentages were each averaged from 1988 until 2010 to obtain a most likely value. Each factor was then simulated by applying the Monte Carlo method (@Risk, 2010). The triangular distribution was utilized, with the minimum, most likely, and maximum values shown in Table 6 alongside the simulation results.

**Table 6. Monte Carlo Simulation Model Factors**

<b>Model Factor</b>	<b>Min</b>	<b>Likely</b>	<b>Max</b>	<b>Sim Result</b>
<b>Inflation</b>	-0.40%	2.88%	5.39%	2.62%
<b>TSP Return Rate</b>	2.81%	5.92%	8.89%	5.87%
<b>Military Pay Raise</b>	0.00%	3.57%	6.90%	3.49%
<b>COLA</b>	0.00%	3.03%	5.80%	2.94%

In February 2011, President Barack Obama created the National Commission on Fiscal Responsibility and Reform, a bipartisan organization dedicated to improving the financial outlook of the United States as well as lowering the national deficit. Among other proposals, the commission will be considering recommendations to cut defense spending by \$100 billion over the next five years. As a part of the defense spending portion of the proposal, non-combat military pay would be frozen for the next three years and the number of military positions would decrease by up to 88,000 (National Commission on Fiscal Responsibility and Reform, 2011). To mimic the possibility of no pay raise in a given year, which has not happened since 1962, the low value of 0% was used to simulate the military pay raise percentage for the models (Department of Defense, Office of the Under Secretary of Defense (Comptroller), 2010).

Microsoft Excel models were created that depict each individual month of contributions and withdrawals. In all scenarios, the amount of government contribution into each account is 7.5% of basic pay at the end of each month. Columns were then created that summarized the contributions and government savings by year. Government savings are 10% of what a member would have received in monthly payments under the High-36 method. For the sake of transparency in calculations, the date of enlistment for all of the case studies is January 1, 2011, and all birthdays occur on January 1st. All values were returned to net present value (NPV) 2011 so that costs and benefits could be easily compared. A flow chart of the model inputs and outputs is shown in Figure 3.



**Figure 3. Model inputs and outputs**

In the models using retirement age to first begin TSP withdrawals, the amount withdrawn from the TSP account monthly was equal to the amount of government savings so the gross income for the retiree was the same. For the models that simulated withdrawals beginning at age 59 ½, as mentioned previously, the enlistment ages were

kept constant at 21 years of age for enlisted Air Force members and 23 years for officers to provide a stable base for the calculations. These average ages are also consistent for Army personnel (United States Army Recruiting, 2010). Instead of a withdrawal equaling the amount of government savings, the withdrawal in that group was 1.7 times the monthly sum of decreased payments to make up for the decreased income between retirement and age 59 ½. The factor was chosen because it generated roughly the same overall amount in NPV 2011 as those who began receiving benefits immediately after retirement assuming average life expectancy.

As with the current retirement plans, no retirement benefit was given for service length under 20 years. United States Code Title 5, Part III, Subpart G, Chapter 84, Subchapter III, Section 8432, governs the Thrift Savings Plan for all eligible participants. Congress mandated that, “contributions made for the benefit of an employee under subsection (c)(1) and all earnings attributable to such contributions shall be forfeited” if specific criteria such as length of service are not met (United States Code, 2010). Using the same methodology, this research assumes that any money contributed by the government as well as its earnings are forfeited if an individual is not retirement eligible.

Because of the unpredictability of tax brackets and individual circumstances, the tax implications were not included in the computations in order to keep a common base. The calculations also did not include the use of forfeited funds of those who separate before retirement. Further details of the results and sensitivity analysis are discussed in Chapter Four.

## **IV. Results and Analysis**

The results and analysis chapter fully explains the outcomes of the employed methodology in terms of government contributions and savings as well as retiree Thrift Savings Plan (TSP) account balances. This section includes a walk-through of a single case study and a thorough sensitivity analysis. Individual results are provided for the Air Force scenarios as well as an extrapolation to the Department of Defense (DoD) for total annual savings.

### **Introduction**

The inclusive results are primarily positive in that the research indicates the proposed alternative system may have a lower overall cost to the government than the legacy High-36 system, with an approximate \$1.75 billion in annual savings (\$BY2011). Additionally, the retirement benefits could potentially be greater for some retirees under the proposed system than the High-36 plan. The alternative system would have a higher up-front cost to the government than the retirement plans currently in use because of the TSP contribution during active duty service time; consequently, government savings would not be fully realized until at least 20 years after inception. The estimated cost increase for the first year of implementation is \$0.53 billion for Air Force personnel and \$2.23 billion for the total DoD.

### **Government Cost and Savings**

The results were compiled in terms of government outlays over the active duty career of individuals, a monthly 7.5% TSP contribution for each service member, and

compared to the amount that the government would save by paying 90% of the High-36 calculated benefits after retirement. Because the DoD is in dire need of cost-cutting measures, it is essential that a replacement system not ultimately exceed the overall funding of the High-36 plan. As of 2010, over 95% of non-reserve non-disability retirees receiving benefits were 88 years of age or younger (Department of Defense, Office of the Actuary, 2010). With that age in mind, this research sought to strike a balance between the TSP account lasting through age 88 or longer as well as the government breaking even on costs before the average life expectancy, which is age 72 for men and 78 for women. A noteworthy result is that the latest the government broke even in any scenario was 50 years after enlistment. The estimated annual savings for each category is included in Table 7.

A noteworthy result is from the case study of the officer serving retiring after 30 years. Due to the disparity in pay between officer pay and enlisted pay, income at the end of an officer's career (and thus, the TSP contribution by default) is considerably higher, as shown in the pay tables in Appendix B. Combined with the short amount of time for the government to essentially recoup its contributions, the DoD stands to gain the least from that demographic, although the end result is still positive for both parties.

**Table 7. Potential Annual Savings for Individual Air Force Personnel (\$BY2011)**

20 Years of Service		23 Years of Service		30 Years of Service	
Category	Gov Savings	Category	Gov Savings	Category	Gov Savings
Enlisted	\$1,067.25	Enlisted	\$1,550.73	Enlisted	\$1,454.72
Officer	\$1,582.46	Officer	\$1,967.76	Officer	\$283.17
Prior-E	\$1,957.15	Prior-E	\$2,306.23	Prior-E	\$2,227.36

Table 8 summarizes potential Air Force and Department of Defense savings based on 1,468,377 retirees receiving benefits as of September 30, 2009, the latest information published by the Office of the Actuary. Of those retirees, 543,164 are retired Air Force members. Of DoD retirees, 75.3% are enlisted personnel. The Air Force retiree total is comprised of 76.3% enlisted retirees (Department of Defense, 2010).

**Table 8. Potential Annual Government Savings in Millions (\$BY2011)**

<b>Air Force</b>		<b>Department of Defense</b>	
<b>Category</b>	<b>Gov Savings</b>	<b>Category</b>	<b>Gov Savings</b>
Enlisted	\$442.1	Enlisted	\$1,180.7
Officer	\$203.9	Officer	\$572.9
<b>Total</b>	<b>\$646.0</b>	<b>Total</b>	<b>\$1,753.6</b>

These data did not delineate the number of prior-enlisted retirees; therefore, all prior-enlisted officers were encompassed in the officer category. By using the government break-even point in the model, the annual savings in net present value was calculated for enlisted members entering service at 21 years of age and officers entering at 23 years of age. For the purpose of this calculation, life expectancy was estimated at a conservative 72 years in each scenario.

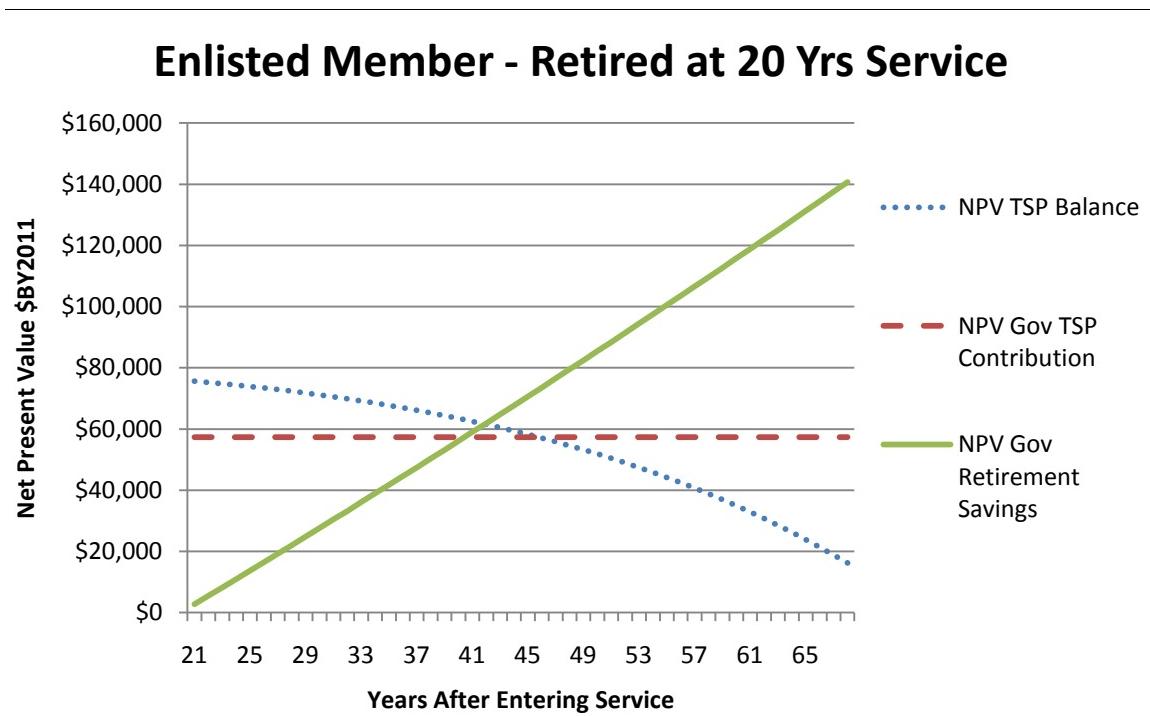
## **Case Studies**

Three main case studies were created to test the proposed alternative and expanded to include three different years of service (YOS) points: 20, 23, and 30. They were then extended to explore the effect of accessing the TSP account at age 59 ½, which

is the current policy for the TSP, as opposed to immediately at retirement. Due to the nature of the decreased payments, government savings increase the longer a member lives after retirement. The case study for an enlisted individual retiring at 20 YOS is fully explained in the following paragraphs. The remainder of the individual case study results is fully documented in Appendixes C and D.

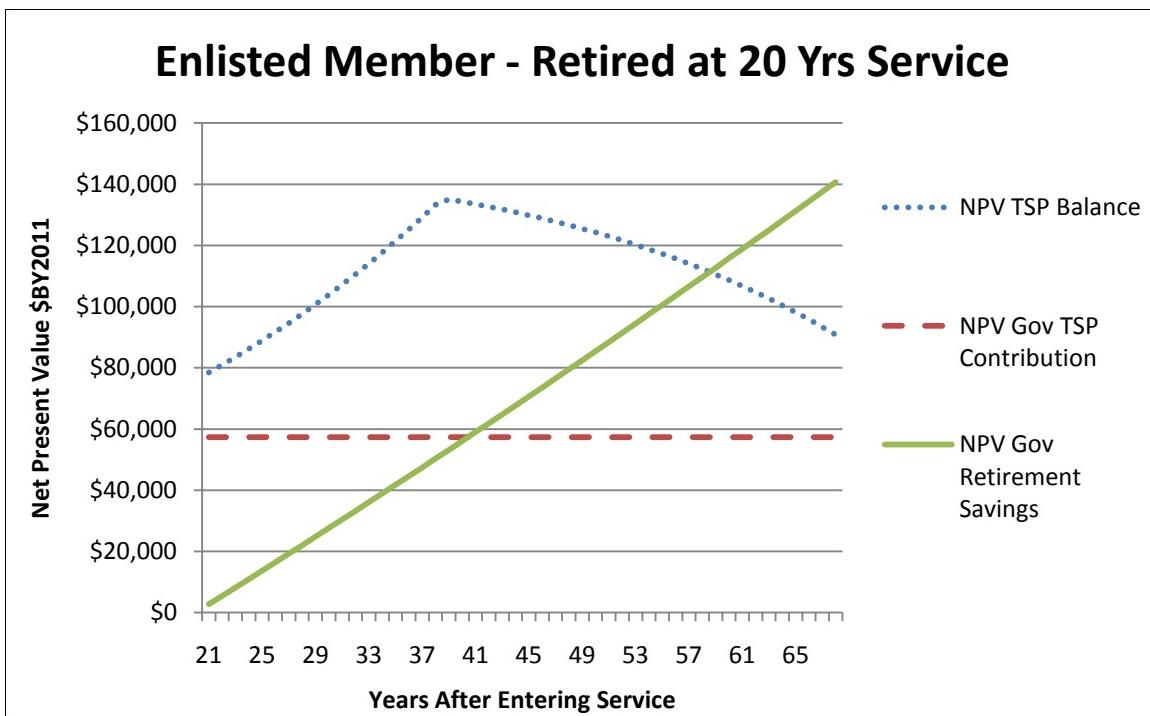
Figure 4 graphically depicts the three relevant monetary streams for an enlisted member retiring at 20 YOS. The chart starts at the beginning of the 21<sup>st</sup> year after the member joined the Air Force. The dashed, red line represents the total government TSP contribution (cost) in \$BY2011 during the period of active duty. The solid, green line shows the government savings in retirement. The intersection of the solid, green line and the solid, red line is where the government breaks even. For every year after that intersection point, the government starts to save money. The dotted, blue line shows the member's TSP account and shows the balance through the 68<sup>th</sup> year after enlistment.

Appendix C includes the corresponding figures for each year. The break-even point for the government occurs during the 41<sup>st</sup> year after enlistment, which is age 62 for an individual entering the service at age 21. The member's TSP account still has a balance at the end of the 68<sup>th</sup> year after enlistment, which lasts through at least 88 years of age in this case study. Members would have the option to withdraw more funds earlier to adjust for a shorter estimated life span.



**Figure 4. Enlisted Member - Retired at 20 Yrs of Service**

Figure 5 represents the same case study with the only differentiation being that the member does not begin withdrawing funds from the TSP until age 59 ½. The government contribution and associated savings do not change. By delaying TSP withdrawals until age 59 ½, the account has a much longer time to grow. To attempt to make up for the period of decreased income, this model assumes the member withdraws 1.7 times the amount of monthly government savings. At the end of the 68th year after enlistment, the member would have received \$10,507 in additional benefits above the High-36 plan, and the TSP account would still have a balance of approximately \$90,785. The analogous calculations are located in Appendix D.



**Figure 5. Enlisted Member - Retired at 20 Yrs of Service**

### Retiree Benefits

An important aspect of this research is that it seeks to find an optimal solution that ultimately saves the government money but does not decrease retiree benefits. One of the most notable outcomes of the model is that in nearly every scenario members preserved a TSP account balance through at least the 68<sup>th</sup> year after enlistment. The only exception for members withdrawing TSP funds immediately after retirement was the enlisted member retiring at 23 years of service. In that scenario, the funds ran out 67 years after enlistment. Of the scenarios which involved withdrawing funds at age 59 ½, only the enlisted member and prior-enlisted member serving over 30 years exhausted their TSP accounts earlier, at 67 and 62 years after enlistment, respectively. Because the 1.7 factor

was used in those scenarios, both received more overall in 2011 net present value and could easily solve that dilemma by withdrawing a lesser monthly amount after age 59 ½.

## Sensitivity Analysis

A sensitivity analysis was performed on the following factors to determine their importance to the outcome: inflation rate, TSP annual rate of return, percentage of annual military pay raise, retiree cost of living adjustment. The result of the sensitivity analysis indicated that if all factors increase or decrease proportionally together the overall outcomes of retiree benefits and government savings hold true.

The most influential singular factor in regards to the amount available in retirement was the TSP return percentage. Although the rate did not affect government cost or savings in any way, it was the most dominant element for individuals. As expected, higher rates of return led to higher TSP balances. The most important factor for the government was the rate of inflation. As inflation rates increase separately of the other factors, the government break-even points occur a few years later because the necessary outlays for each year are higher. Likewise, if the inflation rate is lower, the government breaks even earlier than the simulated values in the models. The length of time before the TSP account is exhausted is essentially the same for service members. Table 9 illustrates the level of sensitivity for the factors.

**Table 9. Sensitivity Analysis Factors**

Factor	Impact to Government	Impact to Retiree
Withdrawal at Age 59 1/2	None	Light
Inflation	Medium ↓	Marginal to none
Thrift Savings Plan Return	None	Heavy ↑
Military Pay Raise	Light ↓	Light ↑
Cost of Living Adjustment	Light ↑	Light ↓
Inflation, TSP Return, Military Pay Raise, and Cost of Living Adjustment	Marginal to none	Marginal to none

Values used in the model for inflation and military pay raises were created by conducting Monte Carlo simulation on historical data. The government projects different numbers in the future and the sensitivity of those numbers was explored. The DoD data includes a 1.7% inflation rate for non-military pay-related spending in future years and a 2.8% annual military pay raise (Assistant Secretary of the Army for Financial Management and Comptroller, 2010). By rerunning the models with the modified data, the overall results, shown in Tables 10 and 11, improved from the ending values that were calculated using the simulated values. The government broke even earlier in most cases and the TSP accounts had more funds available after 68 years in all cases with the exception of the prior-enlisted model over 30 years withdrawing retirement at 59 ½. For

that particular model the results were still improved due to the fact that the government break-even point was earlier. Additionally, the TSP account did not run out until 66 years after retirement as opposed to 63 years with the simulated values from *@Risk*.

**Table 10. Potential Annual Savings for Individual Air Force Personnel (\$BY2011)**

20 Years of Service		23 Years of Service		30 Years of Service	
Category	Gov Savings	Category	Gov Savings	Category	Gov Savings
Enlisted	\$1,673.26	Enlisted	\$2,143.33	Enlisted	\$1,782.88
Officer	\$2,652.22	Officer	\$2,979.21	Officer	\$1,292.43
Prior-E	\$3,030.96	Prior-E	\$3,285.94	Prior-E	\$2,809.13

**Table 11. Potential Annual Government Savings in Millions (\$BY2011)**

Air Force		Department of Defense	
Category	Gov Savings	Category	Gov Savings
Enlisted	\$693.2	Enlisted	\$1,851.2
Officer	\$341.8	Officer	\$960.3
<b>Total</b>	<b>\$1,035.0</b>	<b>Total</b>	<b>\$2,811.5</b>

## **V. Discussion**

### **Research Overview**

The proposed retirement model was designed as a possible replacement or supplement for the military retirement plans presently available to service members. Ideally, a viable alternative retirement system would be capable of providing individuals with at least the same income in retirement as with the current plans and be able to decrease government costs at the same time. The most desirable outcome is one in which the government and retirees both benefit. This research indicates that a win-win situation may be achievable.

The Thrift Savings Plan (TSP) is a fairly straightforward and comprehensible system. Currently 37% of active duty military members already participate in the TSP (Beck, 2010). Because the concept of the program is widely known even to those who do not contribute, it should not be a stretch for members to understand. Having an open TSP account may also generate an unintentional benefit of additional retirement savings because conservative individuals would be able to see the growth of their retirement fund and may choose to contribute a portion of their own income. Similarly, risk-seeking individuals may wish to contribute a portion of their own income to other funds that have a possibility of a higher return rate.

### **Strengths and Limitations**

The main strength of this research is that it approaches the problem from both the side of the government and individual retirees. By comparing government and retiree

benefits side-by-side, it is easier to anticipate results of factor differences and discover a point where both parties benefit. Realistic case studies were attempted for active duty service members to include as much realism as possible. The expansion of the starting scenarios to include the effects of delaying TSP withdrawals until age 59 ½ is also valuable for decision-makers.

A limitation of the research, as with most attempts to forecast future events, is to have a model that relies heavily on factors beyond the control of the government. Any values that could be directly controlled would be static data and not assumptions. A restriction that is within the scope of the government is the size of the future force. Because of that, individual case studies were created so that results could be multiplied or extrapolated for the applicable force size and demographic.

The reliance on the economic factors creates many unknowns for the model. The stock market is volatile and does not ensure guaranteed income; therefore, any simulated investment returns for the Thrift Savings Plan may not be indicative of actual values. For this reason, defined benefit plans as opposed to defined contribution plans are generally more popular. This model combines the two categories of pension plans, defined benefit and defined contribution, into a plan with secure income along with the opportunity to obtain an even higher relative percentage of income due to the nature of the stock market. It also gives individuals the option to view a portion of their own retirement and take ownership in the process.

## **Recommendations for Future Research**

The military retirement arena is rich with research possibilities. Due to fiscal constraints, the Department of Defense (DoD) is continuously searching for opportunities to reduce costs. One worthwhile endeavor would be to explore the effects of using a government-run account outside of the TSP. The effect on retention or survivor benefits from the proposed system outlined in this research is unknown and is noted as an area for further research.

Alongside the retention issue is the subject of vesting. The timeframe of availability of funds could make an impact on individual participation, and exploring the possibility of vesting fully at specified intervals would add depth to this retirement plan. Many military studies have discussed the limitations of only receiving retirement benefits after a 20-year career. An interesting expansion of this topic would be to combine the outlined model with an earlier vesting period. If a member were guaranteed the TSP account regardless of length of service, he or she would be able to contribute to riskier funds and not just the guaranteed G Fund.

Several other factors affect the outcome of this research. Policy implications were not assessed during this study; therefore, there was no attempt to predict the use of the forfeited funds from the accounts of those who do not remain in service until retirement. A multi-year appropriation from which to pay future contributions might be the most appropriate. Another option may be to use a graduated scale to slowly increase contributions to minimize the up-front costs. Additional research would need to be conducted for those to be fully workable options for the Department of Defense to institute.

## **Conclusion**

The High-36 retirement plan is a generous pension for military members who remain on active duty service for at least 20 years. The DoD is always actively seeking ways to reduce costs, and in a perfect world those reductions would not occur at the expense of service member benefits. Prudently replacing or supplementing existing retirement plans may enhance options for retirees and ultimately shape a superior force.

The government regularly conducts cost analyses on various programs and plans accordingly for future costs. The implementation of the retirement system outlined in this study would increase DoD expenditures in the short run, but have the potential to generate substantial savings in the long run. The preliminary research on this plan indicates it may prove to be the solid core of a reformed retirement system.

## Appendix A: Historical Data

**Table 12. Military Pay Percentage Increases Since 1946 (Department of Defense, Office of the Under Secretary of Defense (Comptroller), 2011)**

Effective Date	Percentage Increase	Effective Date	Percentage Increase
Jul 1, 1946	23.7	Jan 1, 1985	4.0
Oct 1, 1949	21.6	Oct 1, 1985	3.0
May 1, 1952	10.9	Jan 1, 1987	3.0
Apr 1, 1955	2.8	Jan 1, 1988	2.0
Jun 1, 1958	6.3	Jan 1, 1989	4.1
Oct 1, 1963	8.4	Jan 1, 1990	3.6
Sep 1, 1964	1.4	Jan 1, 1991	4.1
Sep 1, 1965	6.4	Jan 1, 1992	4.2
Jul 1, 1966	2.8	Jan 1, 1993	3.7
Oct 1, 1967	4.5	Jan 1, 1994	2.2
Jul 1, 1968	4.9	Jan 1, 1995	2.6
Jul 1, 1969	9.1	Jan 1, 1996	2.4
Jan 1, 1970	6.0	Jan 1, 1997	3.0
Jan 1, 1971	6.0	Jan 1, 1998	2.8
Nov 14, 1971	13.1	Jan 1, 1999	3.6
Jan 1, 1972	5.5	Jan 1, 2000	4.8
Jan 1, 1973	5.1	Jan 1, 2001	3.7
Oct 1, 1973	4.8	Jan 1, 2002	6.9*
Oct 1, 1974	5.5	Jan 1, 2003	4.7**
Oct 1, 1975	5.0	Jan 1, 2004	4.2***
Oct 1, 1976	4.8	Jan 1, 2005	3.5
Oct 1, 1977	7.0	Jan 1, 2006	3.1
Oct 1, 1978	5.5	Jan 1, 2007	2.2****
Oct 1, 1979	7.0	Jan 1, 2008	3.5
Oct 1, 1980	11.7	Jan 1, 2009	3.9
Oct 1, 1981	14.3	Jan 1, 2010	3.4
Oct 1, 1982	4.0	Jan 1, 2011	1.4
Jan 1, 1984	4.0		

\* Reflects an average 6.9% across-the-board and targeted pay raise

\*\* Reflects an average 4.7% across-the-board and targeted pay raise

\*\*\* Reflects an average 4.15% across-the-board and targeted pay raise

\*\*\*\* Excludes selected targeted increase for certain warrant officers and mid-grade/senior enlisted personnel implemented in FY2007

**Table 13. Thrift Savings Plan G Fund Annual Returns 1988 to 2010 (TSP, 2011)**

<b>Year</b>	<b>TSP Return</b>	<b>Year</b>	<b>TSP Return</b>
1988	8.83%	2000	6.42%
1989	8.82%	2001	5.39%
1990	8.89%	2002	5.00%
1991	8.15%	2003	4.11%
1992	7.24%	2004	4.30%
1993	5.65%	2005	4.49%
1994	7.22%	2006	4.93%
1995	7.03%	2007	4.87%
1996	6.76%	2008	3.75%
1997	6.76%	2009	2.97%
1998	5.76%	2010	2.81%
1999	5.99%		

**Table 14. Historical Annual Inflation Data 1988 to 2010 Based on CPI-U (Bureau of Labor Statistics, 2011)**

<b>Year</b>	<b>Inflation</b>	<b>Year</b>	<b>Inflation</b>
1988	4.10%	2000	3.40%
1989	4.80%	2001	2.80%
1990	5.40%	2002	1.60%
1991	4.20%	2003	2.30%
1992	3.00%	2004	2.70%
1993	3.00%	2005	3.40%
1994	2.60%	2006	3.20%
1995	2.80%	2007	2.80%
1996	3.00%	2008	3.80%
1997	2.30%	2009	-0.40%
1998	1.60%	2010	1.60%
1999	2.20%		

**Table 15. Historical Annual Cost of Living Adjustments 1988 to 2010 (U.S. Office of Personnel Management, 2011)**

Year	COLA	Year	COLA
1988	4.20%	2000	2.50%
1989	4.00%	2001	3.50%
1990	4.70%	2002	2.60%
1991	5.40%	2003	1.40%
1992	3.70%	2004	2.10%
1993	3.00%	2005	2.70%
1994	2.60%	2006	4.10%
1995	2.80%	2007	3.30%
1996	2.60%	2008	2.30%
1997	2.90%	2009	5.80%
1998	2.10%	2010	0.00%
1999	1.30%		

## Appendix B: 2011 Military Pay-Related Tables

**Table 16. 2011 Military Pay Chart Under 20 Yrs of Service (Defense Finance and Accounting Service, 2011)**

<b>BASIC PAY—EFFECTIVE JANUARY 1, 2011</b>											
Pay Grade	2 or less	Over 2	Over 3	Over 4	Over 6	Over 8	Over 10	Over 12	Over 14	Over 16	Over 18
O-10 <sup>1</sup>											
O-9 <sup>1</sup>											
O-8 <sup>1</sup>	9,530.70	9,842.70	10,050.00	10,107.90	10,366.50	10,798.20	10,899.00	11,308.80	11,426.40	11,779.80	12,291.00
O-7 <sup>1</sup>	7,919.10	8,287.20	8,457.30	8,592.60	8,837.70	9,079.80	9,359.70	9,638.70	9,918.60	10,798.20	11,540.70
O-6 <sup>1</sup>	5,869.50	6,448.50	6,871.50	6,871.50	6,897.60	7,193.40	7,232.40	7,232.40	7,643.40	8,370.30	8,796.90
O-5	4,893.00	5,512.20	5,893.80	5,965.80	5,203.70	6,346.20	6,659.40	6,889.20	7,186.20	7,640.70	7,856.70
O-4	4,221.90	4,887.30	5,213.40	5,286.00	5,588.70	5,913.30	6,317.40	6,632.10	6,851.10	6,976.50	7,049.10
O-3	3,711.90	4,208.10	4,542.00	4,951.80	5,188.80	5,449.20	5,617.80	5,894.70	6,039.00	6,039.00	6,039.00
O-2	3,207.30	3,652.80	4,207.20	4,349.10	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50
O-1	2,784.00	2,897.40	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50
O-3 <sup>2</sup>				4,951.80	5,188.80	5,449.20	5,617.80	5,894.70	6,128.10	6,262.20	6,444.90
O-2 <sup>2</sup>					4,349.10	4,438.50	4,580.10	4,618.60	5,002.80	5,140.20	5,140.20
O-1 <sup>2</sup>					3,502.50	3,740.40	3,878.70	4,020.30	4,158.90	4,349.10	4,349.10
W-5											
W-4	3,836.10	4,126.50	4,245.00	4,361.40	4,562.10	4,760.70	4,961.40	5,264.40	5,529.60	5,781.90	5,988.30
W-3	3,502.80	3,648.90	3,798.50	3,847.80	4,004.70	4,313.70	4,635.00	4,786.20	4,961.10	5,142.00	5,466.00
W-2	3,099.90	3,393.00	3,483.30	3,545.40	3,746.40	4,059.00	4,213.50	4,366.20	4,552.50	4,698.00	4,830.00
W-1	2,721.00	3,013.50	3,092.40	3,258.90	3,456.00	3,745.80	3,881.40	4,070.40	4,256.70	4,403.10	4,538.10
E-9 <sup>1</sup>							4,634.70	4,739.70	4,872.00	5,027.70	5,184.60
E-8							3,794.10	3,961.80	4,065.60	4,190.40	4,325.10
E-7	2,637.30	2,876.50	2,988.90	3,135.00	3,249.00	3,444.60	3,554.70	3,750.90	3,913.50	4,024.50	4,143.00
E-6	2,281.20	2,510.10	2,620.80	2,728.50	2,840.70	3,093.60	3,192.30	3,382.80	3,441.00	3,463.60	3,533.40
E-5	2,090.10	2,230.20	2,337.90	2,448.30	2,620.20	2,800.50	2,947.50	2,965.50	2,965.50	2,965.50	2,965.50
E-4	1,916.10	2,014.20	2,123.40	2,230.80	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90
E-3	1,729.80	1,838.70	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00
E-2	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90
E-1 <sup>2</sup>	1,457.60										

**Notes:**

1. Basic pay for an O-7 to O-10 is limited by Level II of the Executive Schedule which is \$14,975.10. Basic pay for O-6 and below is limited by Level V of the Executive Schedule which is \$12,141.60.
2. While serving as Chairman, Joint Chief of Staff/Vice Chairman, Joint Chief of Staff, Chief of Navy Operations, Commandant of the Marine Corps, Army/Air Force Chief of Staff, Commander of a unified or specified combatant command, basic pay is \$20,263.50. (See note 2 above).
3. Applicable to O-1 to O-3 with at least 4 years and 1 day of active duty or more than 1460 points as a warrant and/or enlisted member. See Department of Defense Financial Management Regulations for more detailed explanation on who is eligible for this special basic pay rate.
4. For the Master Chief Petty Officer of the Navy, Chief Master Sergeant of the AF, Sergeant Major of the Army or Marine Corps or Senior Enlisted Advisor of the JCS, basic pay is \$7,489.80. Combat Zone Tax Exclusion for O-1 and above is based on this basic pay rate plus Hostile Fire Pay/Imminent Danger Pay which is \$225.00.
5. Applicable to E-1 with 4 months or more of active duty. Basic pay for an E-1 with less than 4 months of active duty is \$1,357.20.
6. Basic pay rate for Academy Cadets/Midshipmen and ROTC members/applicants is \$974.40.

**Table 17. 2011 Military Pay Chart Over 20 Yrs of Service (Defense Finance and Accounting Service, 2011)**

BASIC PAY—EFFECTIVE JANUARY 1, 2011											
Pay Grade	Over 20	Over 22	Over 24	Over 26	Over 28	Over 30	Over 32	Over 34	Over 36	Over 38	Over 40
O-10 <sup>1</sup>	15,400.80	15,475.80	15,797.70	16,358.40	16,358.40	17,176.20	17,176.20	18,034.80	18,034.80	18,936.90	18,936.90
O-9 <sup>1</sup>	13,459.70	13,663.80	13,944.00	14,433.00	14,433.00	15,155.10	15,155.10	15,912.90	15,912.90	16,708.50	16,708.50
O-8 <sup>1</sup>	12,762.30	13,077.30	13,077.30	13,077.30	13,077.30	13,404.30	13,404.30	13,739.40	13,739.40	13,739.40	13,739.40
O-7 <sup>1</sup>	11,540.70	11,540.70	11,540.70	11,599.50	11,599.50	11,831.70	11,831.70	11,831.70	11,831.70	11,831.70	11,831.70
O-6 <sup>1</sup>	9,222.90	9,465.60	9,711.30	10,187.70	10,187.70	10,391.10	10,391.10	10,391.10	10,391.10	10,391.10	10,391.10
O-5	8,070.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30	8,313.30
O-4	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10	7,049.10
O-3	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00	6,039.00
O-2	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50	4,438.50
O-1	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50	3,502.50
O-3 <sup>2</sup>	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90	6,444.90
O-2 <sup>2</sup>	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20	5,140.20
O-1 <sup>2</sup>	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10	4,349.10
W-5	6,820.80	7,167.00	7,424.70	7,710.00	7,710.00	8,095.80	8,095.80	8,500.50	8,500.50	8,925.90	8,925.90
W-4	6,189.60	6,485.40	6,728.40	7,005.60	7,005.60	7,145.70	7,145.70	7,145.70	7,145.70	7,145.70	7,145.70
W-3	5,685.30	5,816.40	5,955.60	6,144.90	6,144.90	6,144.90	6,144.90	6,144.90	6,144.90	6,144.90	6,144.90
W-2	4,987.80	5,091.60	5,174.10	5,174.10	5,174.10	5,174.10	5,174.10	5,174.10	5,174.10	5,174.10	5,174.10
W-1	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60	4,701.60
E-6 <sup>3</sup>	5,436.60	5,649.30	5,873.40	6,215.70	6,215.70	6,526.20	6,526.20	6,852.90	6,852.90	7,195.80	7,195.80
E-5	4,691.70	4,901.70	5,017.80	5,304.60	5,304.60	5,411.10	5,411.10	5,411.10	5,411.10	5,411.10	5,411.10
E-4	4,189.20	4,342.80	4,425.60	4,740.00	4,740.00	4,740.00	4,740.00	4,740.00	4,740.00	4,740.00	4,740.00
E-3	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40	3,533.40
E-2	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50	2,965.50
E-1	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90	2,325.90
E-3 <sup>4</sup>	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00	1,950.00
E-2 <sup>5</sup>	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90	1,644.90

**Notes:**

1. Basic pay for an O-7 to O-10 is limited by Level II of the Executive Schedule which is \$14,975.10. Basic pay for O-6 and below is limited by Level V of the Executive Schedule which is \$12,141.60.
2. While serving as Chairman, Joint Chief of Staff/Vice Chairman, Joint Chief of Staff, Chief of Navy Operations, Commandant of the Marine Corps, Army/Air Force Chief of Staff, Commander of a unified or specified combatant command, basic pay is \$20,263.50. (See note 1 above).
3. Applicable to O-1 to O-3 with at least 4 years and 1 day of active duty or more than 1460 points as a warrant and/or enlisted member. See Department of Defense Financial Management Regulations for more detailed explanation on who is eligible for this special basic pay rate.
4. For the Master Chief Petty Officer of the Navy, Chief Master Sergeant of the AF, Sergeant Major of the Army or Marine Corps or Senior Enlisted Advisor of the JCS, basic pay is \$7,489.80. Combat Zone Tax Exclusion for O-1 and above is based on this basic pay rate plus Hostile Fire Pay/Imminent Danger Pay which is \$225.00.
5. Applicable to E-1 with 4 months or more of active duty. Basic pay for an E-1 with less than 4 months of active duty is \$1,357.20.
6. Basic pay rate for Academy Cadets/Midshipmen and ROTC members/applicants is \$974.40.

**Table 18. Redux/High-36 Retirement Percentages (Department of Defense, 2010)**

Years of Service	Redux Before Age 62	High-36/Redux After Age 62
20	40.00%	50.00%
21	43.50%	52.50%
22	47.00%	55.00%
23	50.50%	57.50%
24	54.00%	60.00%
25	57.50%	62.50%
26	61.00%	65.00%
27	64.50%	67.50%
28	68.00%	70.00%
29	71.50%	72.50%
30	75.00%	75.00%
31	77.50%	77.50%
32	80.00%	80.00%
33	82.50%	82.50%
34	85.00%	85.00%
35	87.50%	87.50%
36	90.00%	90.00%
37	92.50%	92.50%
38	95.00%	95.00%
39	97.50%	97.50%
40	100.00%	100.00%

**Appendix C: Retirement Model Results – TSP Withdrawals Beginning Immediately After Retirement**

**Table 19. Enlisted Member – Retired at 20 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
21	\$75,671.35	\$57,292.42	\$2,721.89
22	\$75,264.69	\$57,292.42	\$5,452.26
23	\$74,836.41	\$57,292.42	\$8,191.15
24	\$74,385.79	\$57,292.42	\$10,938.58
25	\$73,912.11	\$57,292.42	\$13,694.57
26	\$73,414.61	\$57,292.42	\$16,459.16
27	\$72,892.50	\$57,292.42	\$19,232.37
28	\$72,344.98	\$57,292.42	\$22,014.23
29	\$71,771.21	\$57,292.42	\$24,804.76
30	\$71,170.34	\$57,292.42	\$27,603.99
31	\$70,541.48	\$57,292.42	\$30,411.95
32	\$69,883.71	\$57,292.42	\$33,228.67
33	\$69,196.10	\$57,292.42	\$36,054.17
34	\$68,477.66	\$57,292.42	\$38,888.48
35	\$67,727.40	\$57,292.42	\$41,731.63
36	\$66,944.28	\$57,292.42	\$44,583.64
37	\$66,127.22	\$57,292.42	\$47,444.55
38	\$65,275.13	\$57,292.42	\$50,314.38
39	\$64,386.87	\$57,292.42	\$53,193.16
40	\$63,461.27	\$57,292.42	\$56,080.91
41	\$62,497.10	\$57,292.42	\$58,977.67
42	\$61,493.13	\$57,292.42	\$61,883.46
43	\$60,448.06	\$57,292.42	\$64,798.31
44	\$59,360.56	\$57,292.42	\$67,722.25
45	\$58,229.27	\$57,292.42	\$70,655.31
46	\$57,052.75	\$57,292.42	\$73,597.51
47	\$55,829.56	\$57,292.42	\$76,548.89
48	\$54,558.18	\$57,292.42	\$79,509.47
49	\$53,237.06	\$57,292.42	\$82,479.28
50	\$51,864.60	\$57,292.42	\$85,458.36
51	\$50,439.13	\$57,292.42	\$88,446.72
52	\$48,958.95	\$57,292.42	\$91,444.40
53	\$47,422.30	\$57,292.42	\$94,451.43

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
54	\$45,827.36	\$57,292.42	\$97,467.84
55	\$44,172.25	\$57,292.42	\$100,493.65
56	\$42,455.04	\$57,292.42	\$103,528.89
57	\$40,673.74	\$57,292.42	\$106,573.60
58	\$38,826.27	\$57,292.42	\$109,627.81
59	\$36,910.51	\$57,292.42	\$112,691.54
60	\$34,924.28	\$57,292.42	\$115,764.82
61	\$32,865.31	\$57,292.42	\$118,847.68
62	\$30,731.26	\$57,292.42	\$121,940.16
63	\$28,519.73	\$57,292.42	\$125,042.28
64	\$26,228.23	\$57,292.42	\$128,154.07
65	\$23,854.20	\$57,292.42	\$131,275.57
66	\$21,394.99	\$57,292.42	\$134,406.80
67	\$18,847.88	\$57,292.42	\$137,547.79
68	\$16,210.04	\$57,292.42	\$140,698.58

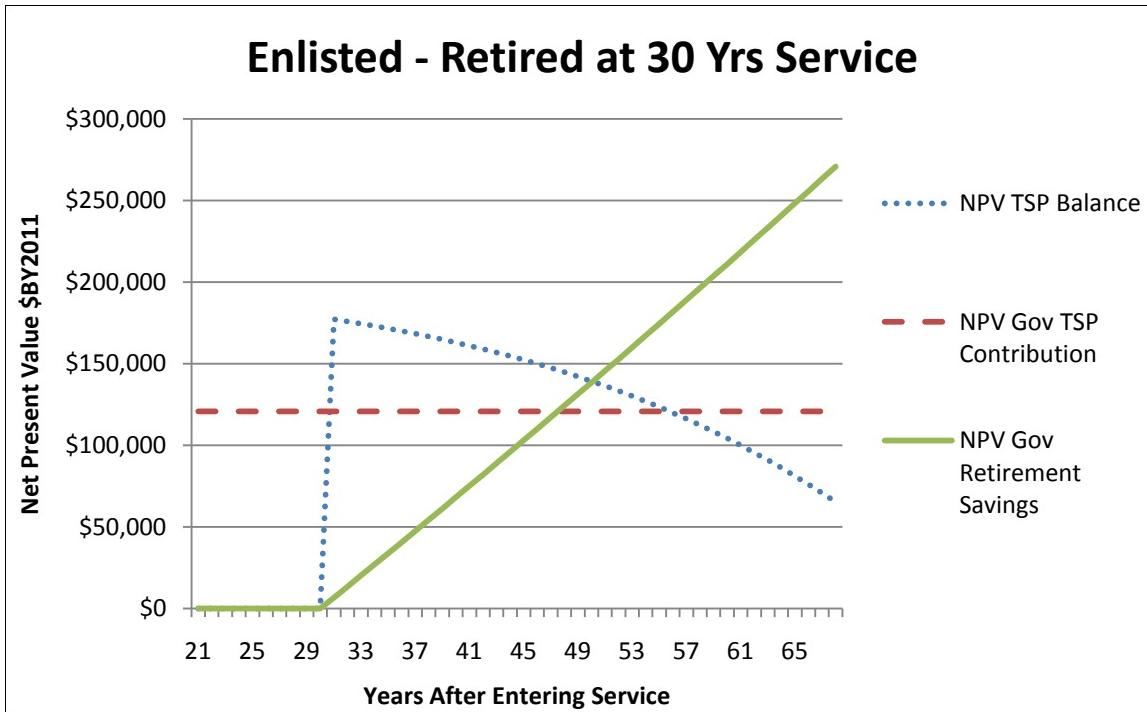


**Figure 6. Enlisted - Retired at 23 Yrs of Service**

**Table 20. Enlisted - Retired at 23 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
24	\$99,858.78	\$73,526.57	\$3,910.53
25	\$98,994.00	\$73,526.57	\$7,833.25
26	\$98,089.27	\$73,526.57	\$11,768.20
27	\$97,143.30	\$73,526.57	\$15,715.42
28	\$96,154.73	\$73,526.57	\$19,674.95
29	\$95,122.18	\$73,526.57	\$23,646.83
30	\$94,044.22	\$73,526.57	\$27,631.09
31	\$92,919.36	\$73,526.57	\$31,627.78
32	\$91,746.09	\$73,526.57	\$35,636.93
33	\$90,522.82	\$73,526.57	\$39,658.58
34	\$89,247.94	\$73,526.57	\$43,692.77
35	\$87,919.77	\$73,526.57	\$47,739.54
36	\$86,536.58	\$73,526.57	\$51,798.92
37	\$85,096.59	\$73,526.57	\$55,870.97
38	\$83,597.97	\$73,526.57	\$59,955.71
39	\$82,038.80	\$73,526.57	\$64,053.19

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$80,417.15	\$73,526.57	\$68,163.45
41	\$78,730.97	\$73,526.57	\$72,286.53
42	\$76,978.20	\$73,526.57	\$76,422.46
43	\$75,156.68	\$73,526.57	\$80,571.28
44	\$73,264.19	\$73,526.57	\$84,733.05
45	\$71,298.45	\$73,526.57	\$88,907.79
46	\$69,257.09	\$73,526.57	\$93,095.55
47	\$67,137.67	\$73,526.57	\$97,296.36
48	\$64,937.69	\$73,526.57	\$101,510.28
49	\$62,654.54	\$73,526.57	\$105,737.34
50	\$60,285.55	\$73,526.57	\$109,977.57
51	\$57,827.97	\$73,526.57	\$114,231.03
52	\$55,278.94	\$73,526.57	\$118,497.75
53	\$52,635.53	\$73,526.57	\$122,777.78
54	\$49,894.70	\$73,526.57	\$127,071.15
55	\$47,053.33	\$73,526.57	\$131,377.91
56	\$44,108.18	\$73,526.57	\$135,698.10
57	\$41,055.94	\$73,526.57	\$140,031.76
58	\$37,893.15	\$73,526.57	\$144,378.94
59	\$34,616.29	\$73,526.57	\$148,739.67
60	\$31,221.70	\$73,526.57	\$153,113.99
61	\$27,705.59	\$73,526.57	\$157,501.96
62	\$24,064.09	\$73,526.57	\$161,903.61
63	\$20,293.17	\$73,526.57	\$166,318.98
64	\$16,388.70	\$73,526.57	\$170,748.13
65	\$12,346.39	\$73,526.57	\$175,191.08
66	\$8,161.85	\$73,526.57	\$179,647.89
67	\$3,830.51	\$73,526.57	\$184,118.59
68	-\$652.30	\$73,526.57	\$188,603.24

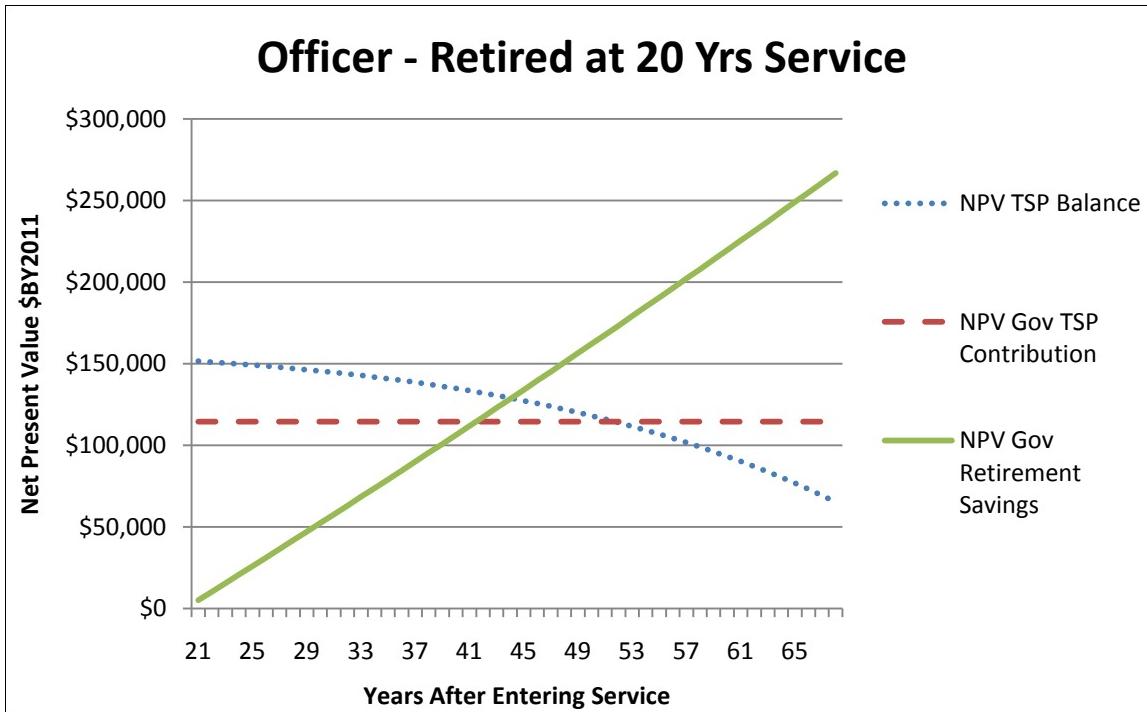


**Figure 7. Enlisted - Retired at 30 Yrs of Service**

**Table 21. Enlisted - Retired at 30 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$177,322.50	\$120,887.44	\$6,724.79
32	\$176,012.70	\$120,887.44	\$13,470.54
33	\$174,639.81	\$120,887.44	\$20,237.33
34	\$173,201.79	\$120,887.44	\$27,025.22
35	\$171,696.49	\$120,887.44	\$33,834.28
36	\$170,121.72	\$120,887.44	\$40,664.56
37	\$168,475.22	\$120,887.44	\$47,516.15
38	\$166,754.64	\$120,887.44	\$54,389.10
39	\$164,957.57	\$120,887.44	\$61,283.48
40	\$163,081.51	\$120,887.44	\$68,199.36
41	\$161,123.91	\$120,887.44	\$75,136.81
42	\$159,082.09	\$120,887.44	\$82,095.89
43	\$156,953.34	\$120,887.44	\$89,076.66
44	\$154,734.83	\$120,887.44	\$96,079.21
45	\$152,423.64	\$120,887.44	\$103,103.59
46	\$150,016.76	\$120,887.44	\$110,149.87

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$147,511.11	\$120,887.44	\$117,218.13
48	\$144,903.48	\$120,887.44	\$124,308.42
49	\$142,190.57	\$120,887.44	\$131,420.83
50	\$139,368.97	\$120,887.44	\$138,555.41
51	\$136,435.17	\$120,887.44	\$145,712.24
52	\$133,385.56	\$120,887.44	\$152,891.38
53	\$130,216.38	\$120,887.44	\$160,092.91
54	\$126,923.78	\$120,887.44	\$167,316.90
55	\$123,503.79	\$120,887.44	\$174,563.42
56	\$119,952.28	\$120,887.44	\$181,832.53
57	\$116,265.04	\$120,887.44	\$189,124.30
58	\$112,437.67	\$120,887.44	\$196,438.81
59	\$108,465.69	\$120,887.44	\$203,776.14
60	\$104,344.42	\$120,887.44	\$211,136.34
61	\$100,069.07	\$120,887.44	\$218,519.49
62	\$95,634.69	\$120,887.44	\$225,925.66
63	\$91,036.17	\$120,887.44	\$233,354.93
64	\$86,268.24	\$120,887.44	\$240,807.36
65	\$81,325.45	\$120,887.44	\$248,283.03
66	\$76,202.19	\$120,887.44	\$255,782.02
67	\$70,892.68	\$120,887.44	\$263,304.38
68	\$65,390.94	\$120,887.44	\$270,850.20

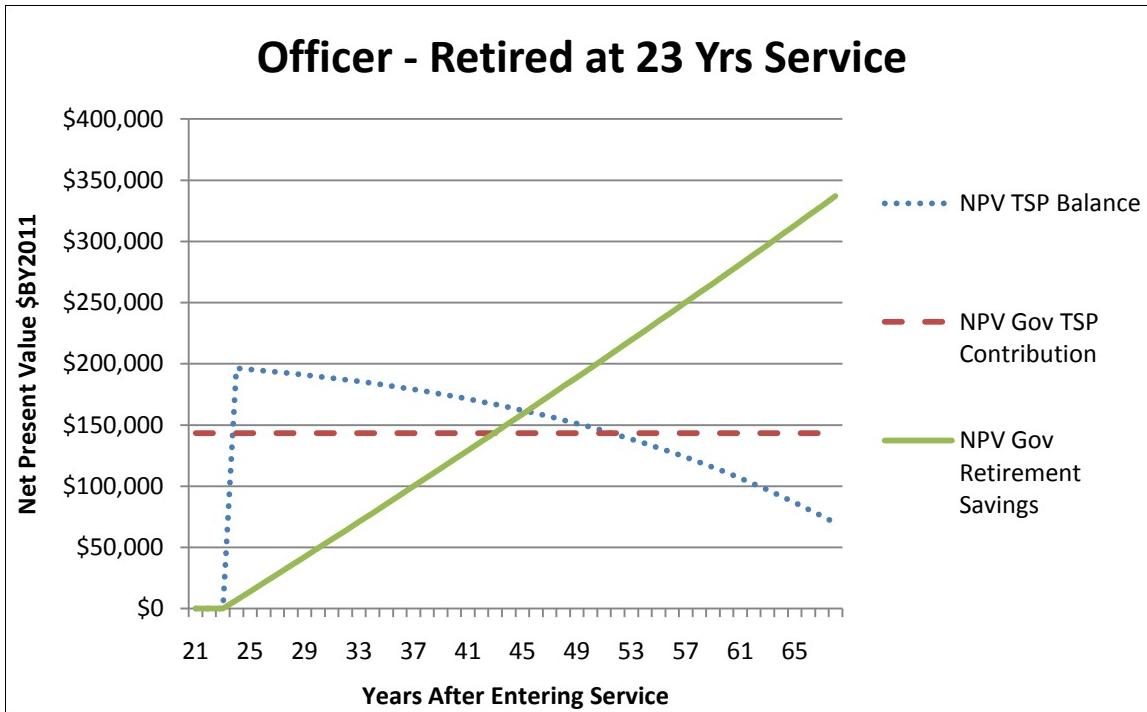


**Figure 8. Officer - Retired at 20 Yrs of Service**

**Table 22. Officer - Retired at 20 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
21	\$151,559.48	\$114,646.25	\$5,163.59
22	\$151,041.56	\$114,646.25	\$10,343.28
23	\$150,490.66	\$114,646.25	\$15,539.13
24	\$149,905.68	\$114,646.25	\$20,751.17
25	\$149,285.49	\$114,646.25	\$25,979.47
26	\$148,628.91	\$114,646.25	\$31,224.07
27	\$147,934.76	\$114,646.25	\$36,485.03
28	\$147,201.78	\$114,646.25	\$41,762.39
29	\$146,428.69	\$114,646.25	\$47,056.20
30	\$145,614.18	\$114,646.25	\$52,366.52
31	\$144,756.86	\$114,646.25	\$57,693.40
32	\$143,855.35	\$114,646.25	\$63,036.90
33	\$142,908.18	\$114,646.25	\$68,397.05
34	\$141,913.85	\$114,646.25	\$73,773.92
35	\$140,870.82	\$114,646.25	\$79,167.55
36	\$139,777.50	\$114,646.25	\$84,578.00

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
37	\$138,632.22	\$114,646.25	\$90,005.32
38	\$137,433.31	\$114,646.25	\$95,449.57
39	\$136,178.99	\$114,646.25	\$100,910.79
40	\$134,867.47	\$114,646.25	\$106,389.04
41	\$133,496.88	\$114,646.25	\$111,884.38
42	\$132,065.29	\$114,646.25	\$117,396.85
43	\$130,570.72	\$114,646.25	\$122,926.51
44	\$129,011.11	\$114,646.25	\$128,473.41
45	\$127,384.35	\$114,646.25	\$134,037.60
46	\$125,688.26	\$114,646.25	\$139,619.15
47	\$123,920.60	\$114,646.25	\$145,218.10
48	\$122,079.02	\$114,646.25	\$150,834.51
49	\$120,161.15	\$114,646.25	\$156,468.44
50	\$118,164.50	\$114,646.25	\$162,119.93
51	\$116,086.53	\$114,646.25	\$167,789.04
52	\$113,924.60	\$114,646.25	\$173,475.83
53	\$111,676.00	\$114,646.25	\$179,180.36
54	\$109,337.92	\$114,646.25	\$184,902.67
55	\$106,907.49	\$114,646.25	\$190,642.83
56	\$104,381.71	\$114,646.25	\$196,400.88
57	\$101,757.50	\$114,646.25	\$202,176.89
58	\$99,031.70	\$114,646.25	\$207,970.91
59	\$96,201.02	\$114,646.25	\$213,782.99
60	\$93,262.10	\$114,646.25	\$219,613.20
61	\$90,211.43	\$114,646.25	\$225,461.59
62	\$87,045.43	\$114,646.25	\$231,328.22
63	\$83,760.39	\$114,646.25	\$237,213.14
64	\$80,352.47	\$114,646.25	\$243,116.41
65	\$76,817.73	\$114,646.25	\$249,038.09
66	\$73,152.09	\$114,646.25	\$254,978.23
67	\$69,351.35	\$114,646.25	\$260,936.89
68	\$65,411.16	\$114,646.25	\$266,914.14

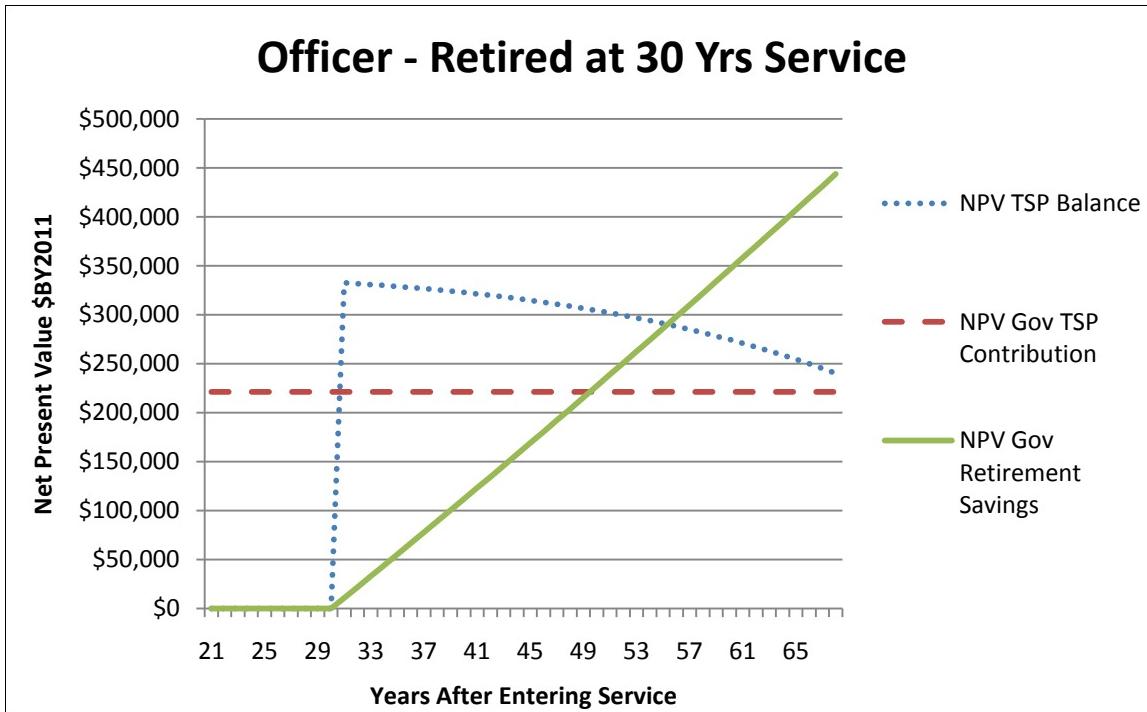


**Figure 9. Officer - Retired at 23 Yrs of Service**

**Table 23. Officer - Retired at 23 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
24	\$196,433.09	\$143,394.42	\$6,987.90
25	\$195,457.54	\$143,394.42	\$13,997.59
26	\$194,428.65	\$143,394.42	\$21,029.13
27	\$193,344.66	\$143,394.42	\$28,082.61
28	\$192,203.76	\$143,394.42	\$35,158.07
29	\$191,004.09	\$143,394.42	\$42,255.60
30	\$189,743.70	\$143,394.42	\$49,375.26
31	\$188,420.60	\$143,394.42	\$56,517.12
32	\$187,032.74	\$143,394.42	\$63,681.25
33	\$185,577.99	\$143,394.42	\$70,867.72
34	\$184,054.16	\$143,394.42	\$78,076.60
35	\$182,459.00	\$143,394.42	\$85,307.96
36	\$180,790.17	\$143,394.42	\$92,561.86
37	\$179,045.26	\$143,394.42	\$99,838.39
38	\$177,221.81	\$143,394.42	\$107,137.60
39	\$175,317.24	\$143,394.42	\$114,459.58

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$173,328.91	\$143,394.42	\$121,804.39
41	\$171,254.10	\$143,394.42	\$129,172.10
42	\$169,090.00	\$143,394.42	\$136,562.78
43	\$166,833.71	\$143,394.42	\$143,976.51
44	\$164,482.22	\$143,394.42	\$151,413.36
45	\$162,032.46	\$143,394.42	\$158,873.39
46	\$159,481.24	\$143,394.42	\$166,356.69
47	\$156,825.26	\$143,394.42	\$173,863.32
48	\$154,061.14	\$143,394.42	\$181,393.36
49	\$151,185.37	\$143,394.42	\$188,946.88
50	\$148,194.36	\$143,394.42	\$196,523.95
51	\$145,084.36	\$143,394.42	\$204,124.65
52	\$141,851.54	\$143,394.42	\$211,749.05
53	\$138,491.93	\$143,394.42	\$219,397.23
54	\$135,001.44	\$143,394.42	\$227,069.25
55	\$131,375.85	\$143,394.42	\$234,765.20
56	\$127,610.80	\$143,394.42	\$242,485.14
57	\$123,701.81	\$143,394.42	\$250,229.16
58	\$119,644.22	\$143,394.42	\$257,997.32
59	\$115,433.27	\$143,394.42	\$265,789.71
60	\$111,064.02	\$143,394.42	\$273,606.39
61	\$106,531.37	\$143,394.42	\$281,447.45
62	\$101,830.08	\$143,394.42	\$289,312.96
63	\$96,954.72	\$143,394.42	\$297,202.99
64	\$91,899.70	\$143,394.42	\$305,117.63
65	\$86,659.25	\$143,394.42	\$313,056.95
66	\$81,227.43	\$143,394.42	\$321,021.02
67	\$75,598.10	\$143,394.42	\$329,009.93
68	\$69,764.91	\$143,394.42	\$337,023.75



**Figure 10. Officer - Retired at 30 Yrs of Service**

**Table 24. Officer - Retired at 30 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$332,643.13	\$221,432.62	\$11,022.11
32	\$331,826.64	\$221,432.62	\$22,078.58
33	\$330,948.89	\$221,432.62	\$33,169.53
34	\$330,007.85	\$221,432.62	\$44,295.07
35	\$329,001.38	\$221,432.62	\$55,455.29
36	\$327,927.32	\$221,432.62	\$66,650.32
37	\$326,783.40	\$221,432.62	\$77,880.25
38	\$325,567.30	\$221,432.62	\$89,145.20
39	\$324,276.63	\$221,432.62	\$100,445.28
40	\$322,908.91	\$221,432.62	\$111,780.60
41	\$321,461.59	\$221,432.62	\$123,151.26
42	\$319,932.03	\$221,432.62	\$134,557.37
43	\$318,317.52	\$221,432.62	\$145,999.05
44	\$316,615.25	\$221,432.62	\$157,476.41
45	\$314,822.33	\$221,432.62	\$168,989.56
46	\$312,935.77	\$221,432.62	\$180,538.61

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$310,952.49	\$221,432.62	\$192,123.67
48	\$308,869.32	\$221,432.62	\$203,744.86
49	\$306,682.97	\$221,432.62	\$215,402.28
50	\$304,390.07	\$221,432.62	\$227,096.05
51	\$301,987.11	\$221,432.62	\$238,826.29
52	\$299,470.50	\$221,432.62	\$250,593.10
53	\$296,836.53	\$221,432.62	\$262,396.61
54	\$294,081.35	\$221,432.62	\$274,236.92
55	\$291,201.01	\$221,432.62	\$286,114.15
56	\$288,191.44	\$221,432.62	\$298,028.42
57	\$285,048.41	\$221,432.62	\$309,979.83
58	\$281,767.59	\$221,432.62	\$321,968.52
59	\$278,344.48	\$221,432.62	\$333,994.59
60	\$274,774.47	\$221,432.62	\$346,058.15
61	\$271,052.78	\$221,432.62	\$358,159.34
62	\$267,174.49	\$221,432.62	\$370,298.25
63	\$263,134.52	\$221,432.62	\$382,475.02
64	\$258,927.62	\$221,432.62	\$394,689.76
65	\$254,548.39	\$221,432.62	\$406,942.59
66	\$249,991.25	\$221,432.62	\$419,233.62
67	\$245,250.44	\$221,432.62	\$431,562.98
68	\$240,320.02	\$221,432.62	\$443,930.79

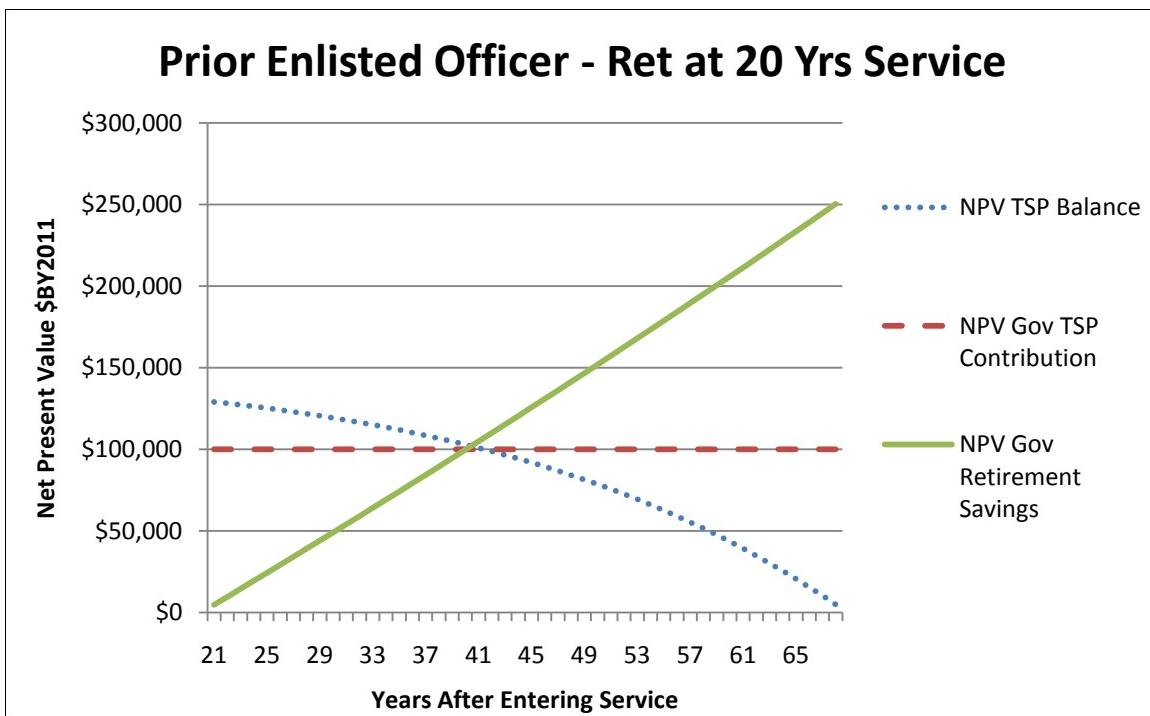


Figure 11. Prior Enlisted Officer - Retired at 20 Yrs of Service

Table 25. Prior Enlisted Officer - Retired at 20 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
21	\$129,125.82	\$100,088.42	\$4,843.36
22	\$128,227.23	\$100,088.42	\$9,701.81
23	\$127,284.64	\$100,088.42	\$14,575.42
24	\$126,296.59	\$100,088.42	\$19,464.23
25	\$125,261.61	\$100,088.42	\$24,368.28
26	\$124,178.14	\$100,088.42	\$29,287.62
27	\$123,044.62	\$100,088.42	\$34,222.30
28	\$121,859.40	\$100,088.42	\$39,172.36
29	\$120,620.80	\$100,088.42	\$44,137.87
30	\$119,327.07	\$100,088.42	\$49,118.85
31	\$117,976.43	\$100,088.42	\$54,115.37
32	\$116,567.03	\$100,088.42	\$59,127.47
33	\$115,096.94	\$100,088.42	\$64,155.20
34	\$113,564.20	\$100,088.42	\$69,198.60
35	\$111,966.77	\$100,088.42	\$74,257.73
36	\$110,302.56	\$100,088.42	\$79,332.64

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
37	\$108,569.40	\$100,088.42	\$84,423.37
38	\$106,765.05	\$100,088.42	\$89,529.97
39	\$104,887.22	\$100,088.42	\$94,652.50
40	\$102,933.51	\$100,088.42	\$99,791.00
41	\$100,901.49	\$100,088.42	\$104,945.53
42	\$98,788.61	\$100,088.42	\$110,116.12
43	\$96,592.26	\$100,088.42	\$115,302.84
44	\$94,309.76	\$100,088.42	\$120,505.74
45	\$91,938.31	\$100,088.42	\$125,724.85
46	\$89,475.05	\$100,088.42	\$130,960.24
47	\$86,917.03	\$100,088.42	\$136,211.96
48	\$84,261.18	\$100,088.42	\$141,480.05
49	\$81,504.35	\$100,088.42	\$146,764.57
50	\$78,643.31	\$100,088.42	\$152,065.57
51	\$75,674.68	\$100,088.42	\$157,383.09
52	\$72,595.02	\$100,088.42	\$162,717.20
53	\$69,400.76	\$100,088.42	\$168,067.94
54	\$66,088.20	\$100,088.42	\$173,435.37
55	\$62,653.56	\$100,088.42	\$178,819.53
56	\$59,092.91	\$100,088.42	\$184,220.48
57	\$55,402.20	\$100,088.42	\$189,638.27
58	\$51,577.27	\$100,088.42	\$195,072.96
59	\$47,613.81	\$100,088.42	\$200,524.59
60	\$43,507.37	\$100,088.42	\$205,993.22
61	\$39,253.38	\$100,088.42	\$211,478.90
62	\$34,847.11	\$100,088.42	\$216,981.69
63	\$30,283.68	\$100,088.42	\$222,501.64
64	\$25,558.06	\$100,088.42	\$228,038.80
65	\$20,665.06	\$100,088.42	\$233,593.23
66	\$15,599.32	\$100,088.42	\$239,164.97
67	\$10,355.31	\$100,088.42	\$244,754.09
68	\$4,927.34	\$100,088.42	\$250,360.64



**Figure 12. Prior Enlisted Officer - Retired at 23 Yrs of Service**

**Table 26. Prior Enlisted Officer - Retired at 23 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
24	\$169,392.09	\$126,351.03	\$6,376.82
25	\$168,189.49	\$126,351.03	\$12,773.51
26	\$166,928.32	\$126,351.03	\$19,190.16
27	\$165,606.67	\$126,351.03	\$25,626.81
28	\$164,222.56	\$126,351.03	\$32,083.54
29	\$162,773.95	\$126,351.03	\$38,560.40
30	\$161,258.73	\$126,351.03	\$45,057.45
31	\$159,674.72	\$126,351.03	\$51,574.76
32	\$158,019.68	\$126,351.03	\$58,112.40
33	\$156,291.30	\$126,351.03	\$64,670.42
34	\$154,487.19	\$126,351.03	\$71,248.89
35	\$152,604.89	\$126,351.03	\$77,847.88
36	\$150,641.85	\$126,351.03	\$84,467.44
37	\$148,595.45	\$126,351.03	\$91,107.64
38	\$146,462.99	\$126,351.03	\$97,768.54
39	\$144,241.66	\$126,351.03	\$104,450.22

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$141,928.61	\$126,351.03	\$111,152.73
41	\$139,520.84	\$126,351.03	\$117,876.15
42	\$137,015.29	\$126,351.03	\$124,620.52
43	\$134,408.81	\$126,351.03	\$131,385.93
44	\$131,698.13	\$126,351.03	\$138,172.43
45	\$128,879.87	\$126,351.03	\$144,980.10
46	\$125,950.57	\$126,351.03	\$151,808.99
47	\$122,906.64	\$126,351.03	\$158,659.17
48	\$119,744.38	\$126,351.03	\$165,530.72
49	\$116,459.97	\$126,351.03	\$172,423.69
50	\$113,049.49	\$126,351.03	\$179,338.16
51	\$109,508.86	\$126,351.03	\$186,274.19
52	\$105,833.90	\$126,351.03	\$193,231.84
53	\$102,020.28	\$126,351.03	\$200,211.19
54	\$98,063.55	\$126,351.03	\$207,212.31
55	\$93,959.10	\$126,351.03	\$214,235.25
56	\$89,702.18	\$126,351.03	\$221,280.10
57	\$85,287.89	\$126,351.03	\$228,346.91
58	\$80,711.18	\$126,351.03	\$235,435.75
59	\$75,966.84	\$126,351.03	\$242,546.70
60	\$71,049.49	\$126,351.03	\$249,679.83
61	\$65,953.57	\$126,351.03	\$256,835.20
62	\$60,673.37	\$126,351.03	\$264,012.87
63	\$55,202.96	\$126,351.03	\$271,212.94
64	\$49,536.26	\$126,351.03	\$278,435.45
65	\$43,666.98	\$126,351.03	\$285,680.48
66	\$37,588.63	\$126,351.03	\$292,948.10
67	\$31,294.52	\$126,351.03	\$300,238.39
68	\$24,777.75	\$126,351.03	\$307,551.41



Figure 13. Prior Enlisted Officer - Retired at 30 Yrs of Service

Table 27. Prior Enlisted Officer - Retired at 30 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$294,713.85	\$201,591.24	\$11,022.11
32	\$292,696.17	\$201,591.24	\$22,078.58
33	\$290,579.20	\$201,591.24	\$33,169.53
34	\$288,359.67	\$201,591.24	\$44,295.07
35	\$286,034.25	\$201,591.24	\$55,455.29
36	\$283,599.44	\$201,591.24	\$66,650.32
37	\$281,051.70	\$201,591.24	\$77,880.25
38	\$278,387.31	\$201,591.24	\$89,145.20
39	\$275,602.49	\$201,591.24	\$100,445.28
40	\$272,693.30	\$201,591.24	\$111,780.60
41	\$269,655.69	\$201,591.24	\$123,151.26
42	\$266,485.47	\$201,591.24	\$134,557.37
43	\$263,178.35	\$201,591.24	\$145,999.05
44	\$259,729.87	\$201,591.24	\$157,476.41
45	\$256,135.43	\$201,591.24	\$168,989.56
46	\$252,390.30	\$201,591.24	\$180,538.61

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$248,489.60	\$201,591.24	\$192,123.67
48	\$244,428.27	\$201,591.24	\$203,744.86
49	\$240,201.13	\$201,591.24	\$215,402.28
50	\$235,802.79	\$201,591.24	\$227,096.05
51	\$231,227.73	\$201,591.24	\$238,826.29
52	\$226,470.23	\$201,591.24	\$250,593.10
53	\$221,524.39	\$201,591.24	\$262,396.61
54	\$216,384.14	\$201,591.24	\$274,236.92
55	\$211,043.19	\$201,591.24	\$286,114.15
56	\$205,495.08	\$201,591.24	\$298,028.42
57	\$199,733.12	\$201,591.24	\$309,979.83
58	\$193,750.43	\$201,591.24	\$321,968.52
59	\$187,539.89	\$201,591.24	\$333,994.59
60	\$181,094.17	\$201,591.24	\$346,058.15
61	\$174,405.70	\$201,591.24	\$358,159.34
62	\$167,466.67	\$201,591.24	\$370,298.25
63	\$160,269.02	\$201,591.24	\$382,475.02
64	\$152,804.46	\$201,591.24	\$394,689.76
65	\$145,064.39	\$201,591.24	\$406,942.59
66	\$137,039.97	\$201,591.24	\$419,233.62
67	\$128,722.09	\$201,591.24	\$431,562.98
68	\$120,101.31	\$201,591.24	\$443,930.79

## Appendix D: Retirement Model Results – TSP Withdrawals Beginning at Age 59 ½

**Table 28. Enlisted Member - Retired at 20 Yrs of Service (\$BY2011)**

<b>Year</b>	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
21	\$78,465.76	\$57,292.42	\$2,721.89
22	\$80,950.71	\$57,292.42	\$5,452.26
23	\$83,514.35	\$57,292.42	\$8,191.15
24	\$86,159.19	\$57,292.42	\$10,938.58
25	\$88,887.78	\$57,292.42	\$13,694.57
26	\$91,702.79	\$57,292.42	\$16,459.16
27	\$94,606.94	\$57,292.42	\$19,232.37
28	\$97,603.07	\$57,292.42	\$22,014.23
29	\$100,694.08	\$57,292.42	\$24,804.76
30	\$103,882.99	\$57,292.42	\$27,603.99
31	\$107,172.88	\$57,292.42	\$30,411.95
32	\$110,566.96	\$57,292.42	\$33,228.67
33	\$114,068.53	\$57,292.42	\$36,054.17
34	\$117,680.99	\$57,292.42	\$38,888.48
35	\$121,407.86	\$57,292.42	\$41,731.63
36	\$125,252.75	\$57,292.42	\$44,583.64
37	\$129,219.41	\$57,292.42	\$47,444.55
38	\$133,311.69	\$57,292.42	\$50,314.38
39	\$135,057.25	\$57,292.42	\$53,193.16
40	\$134,294.44	\$57,292.42	\$56,080.91
41	\$133,491.75	\$57,292.42	\$58,977.67
42	\$132,647.88	\$57,292.42	\$61,883.46
43	\$131,761.47	\$57,292.42	\$64,798.31
44	\$130,831.13	\$57,292.42	\$67,722.25
45	\$129,855.41	\$57,292.42	\$70,655.31
46	\$128,832.82	\$57,292.42	\$73,597.51
47	\$127,761.84	\$57,292.42	\$76,548.89
48	\$126,640.89	\$57,292.42	\$79,509.47
49	\$125,468.32	\$57,292.42	\$82,479.28
50	\$124,242.45	\$57,292.42	\$85,458.36
51	\$122,961.55	\$57,292.42	\$88,446.72
52	\$121,623.82	\$57,292.42	\$91,444.40
53	\$120,227.41	\$57,292.42	\$94,451.43

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
54	\$118,770.41	\$57,292.42	\$97,467.84
55	\$117,250.86	\$57,292.42	\$100,493.65
56	\$115,666.71	\$57,292.42	\$103,528.89
57	\$114,015.88	\$57,292.42	\$106,573.60
58	\$112,296.20	\$57,292.42	\$109,627.81
59	\$110,505.43	\$57,292.42	\$112,691.54
60	\$108,641.28	\$57,292.42	\$115,764.82
61	\$106,701.37	\$57,292.42	\$118,847.68
62	\$104,683.25	\$57,292.42	\$121,940.16
63	\$102,584.38	\$57,292.42	\$125,042.28
64	\$100,402.16	\$57,292.42	\$128,154.07
65	\$98,133.90	\$57,292.42	\$131,275.57
66	\$95,776.82	\$57,292.42	\$134,406.80
67	\$93,328.04	\$57,292.42	\$137,547.79
68	\$90,784.63	\$57,292.42	\$140,698.58



**Figure 14. Enlisted - Retired at 23 Yrs of Service**

**Table 29. Enlisted - Retired at 23 Yrs of Service (\$BY2011)**

<b>Year</b>	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
24	\$103,873.49	\$73,526.57	\$3,910.53
25	\$107,163.08	\$73,526.57	\$7,833.25
26	\$110,556.85	\$73,526.57	\$11,768.20
27	\$114,058.10	\$73,526.57	\$15,715.42
28	\$117,670.23	\$73,526.57	\$19,674.95
29	\$121,396.76	\$73,526.57	\$23,646.83
30	\$125,241.30	\$73,526.57	\$27,631.09
31	\$129,207.59	\$73,526.57	\$31,627.78
32	\$133,299.50	\$73,526.57	\$35,636.93
33	\$137,520.99	\$73,526.57	\$39,658.58
34	\$141,876.17	\$73,526.57	\$43,692.77
35	\$146,369.28	\$73,526.57	\$47,739.54
36	\$151,004.68	\$73,526.57	\$51,798.92
37	\$155,786.88	\$73,526.57	\$55,870.97
38	\$160,720.53	\$73,526.57	\$59,955.71
39	\$162,285.79	\$73,526.57	\$64,053.19

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$160,251.66	\$73,526.57	\$68,163.45
41	\$158,130.74	\$73,526.57	\$72,286.53
42	\$155,920.21	\$73,526.57	\$76,422.46
43	\$153,617.17	\$73,526.57	\$80,571.28
44	\$151,218.62	\$73,526.57	\$84,733.05
45	\$148,721.46	\$73,526.57	\$88,907.79
46	\$146,122.49	\$73,526.57	\$93,095.55
47	\$143,418.43	\$73,526.57	\$97,296.36
48	\$140,605.86	\$73,526.57	\$101,510.28
49	\$137,681.30	\$73,526.57	\$105,737.34
50	\$134,641.11	\$73,526.57	\$109,977.57
51	\$131,481.56	\$73,526.57	\$114,231.03
52	\$128,198.81	\$73,526.57	\$118,497.75
53	\$124,788.87	\$73,526.57	\$122,777.78
54	\$121,247.66	\$73,526.57	\$127,071.15
55	\$117,570.92	\$73,526.57	\$131,377.91
56	\$113,754.31	\$73,526.57	\$135,698.10
57	\$109,793.33	\$73,526.57	\$140,031.76
58	\$105,683.31	\$73,526.57	\$144,378.94
59	\$101,419.48	\$73,526.57	\$148,739.67
60	\$96,996.88	\$73,526.57	\$153,113.99
61	\$92,410.41	\$73,526.57	\$157,501.96
62	\$87,654.82	\$73,526.57	\$161,903.61
63	\$82,724.66	\$73,526.57	\$166,318.98
64	\$77,614.35	\$73,526.57	\$170,748.13
65	\$72,318.08	\$73,526.57	\$175,191.08
66	\$66,829.91	\$73,526.57	\$179,647.89
67	\$61,143.68	\$73,526.57	\$184,118.59
68	\$55,253.04	\$73,526.57	\$188,603.24

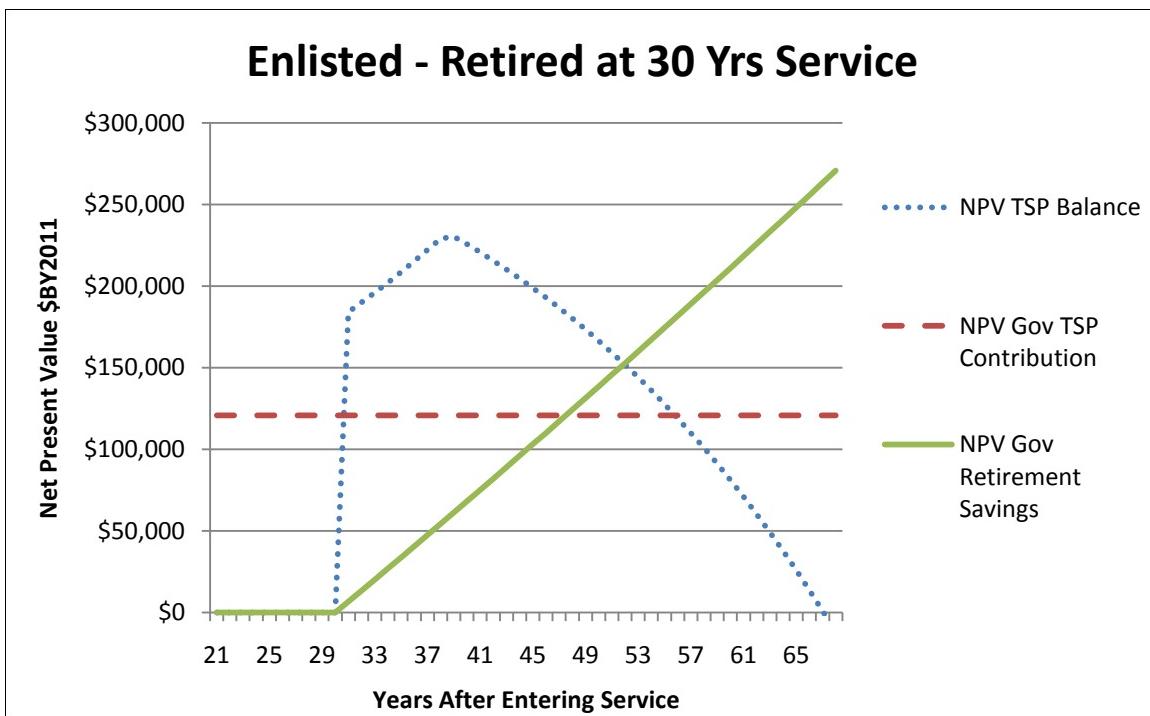


Figure 15. Enlisted - Retired at 30 Yrs of Service

Table 30. Enlisted - Retired at 30 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$184,226.45	\$120,887.44	\$6,724.79
32	\$190,060.76	\$120,887.44	\$13,470.54
33	\$196,079.84	\$120,887.44	\$20,237.33
34	\$202,289.53	\$120,887.44	\$27,025.22
35	\$208,695.88	\$120,887.44	\$33,834.28
36	\$215,305.12	\$120,887.44	\$40,664.56
37	\$222,123.67	\$120,887.44	\$47,516.15
38	\$229,158.15	\$120,887.44	\$54,389.10
39	\$230,484.89	\$120,887.44	\$61,283.48
40	\$225,713.95	\$120,887.44	\$68,199.36
41	\$220,754.27	\$120,887.44	\$75,136.81
42	\$215,599.77	\$120,887.44	\$82,095.89
43	\$210,244.16	\$120,887.44	\$89,076.66
44	\$204,680.94	\$120,887.44	\$96,079.21
45	\$198,903.44	\$120,887.44	\$103,103.59
46	\$192,904.74	\$120,887.44	\$110,149.87

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$186,677.72	\$120,887.44	\$117,218.13
48	\$180,215.03	\$120,887.44	\$124,308.42
49	\$173,509.08	\$120,887.44	\$131,420.83
50	\$166,552.05	\$120,887.44	\$138,555.41
51	\$159,335.88	\$120,887.44	\$145,712.24
52	\$151,852.22	\$120,887.44	\$152,891.38
53	\$144,092.49	\$120,887.44	\$160,092.91
54	\$136,047.83	\$120,887.44	\$167,316.90
55	\$127,709.08	\$120,887.44	\$174,563.42
56	\$119,066.81	\$120,887.44	\$181,832.53
57	\$110,111.29	\$120,887.44	\$189,124.30
58	\$100,832.47	\$120,887.44	\$196,438.81
59	\$91,220.00	\$120,887.44	\$203,776.14
60	\$81,263.17	\$120,887.44	\$211,136.34
61	\$70,950.96	\$120,887.44	\$218,519.49
62	\$60,271.99	\$120,887.44	\$225,925.66
63	\$49,214.53	\$120,887.44	\$233,354.93
64	\$37,766.45	\$120,887.44	\$240,807.36
65	\$25,915.26	\$120,887.44	\$248,283.03
66	\$13,648.06	\$120,887.44	\$255,782.02
67	\$951.57	\$120,887.44	\$263,304.38
68	-\$12,187.95	\$120,887.44	\$270,850.20

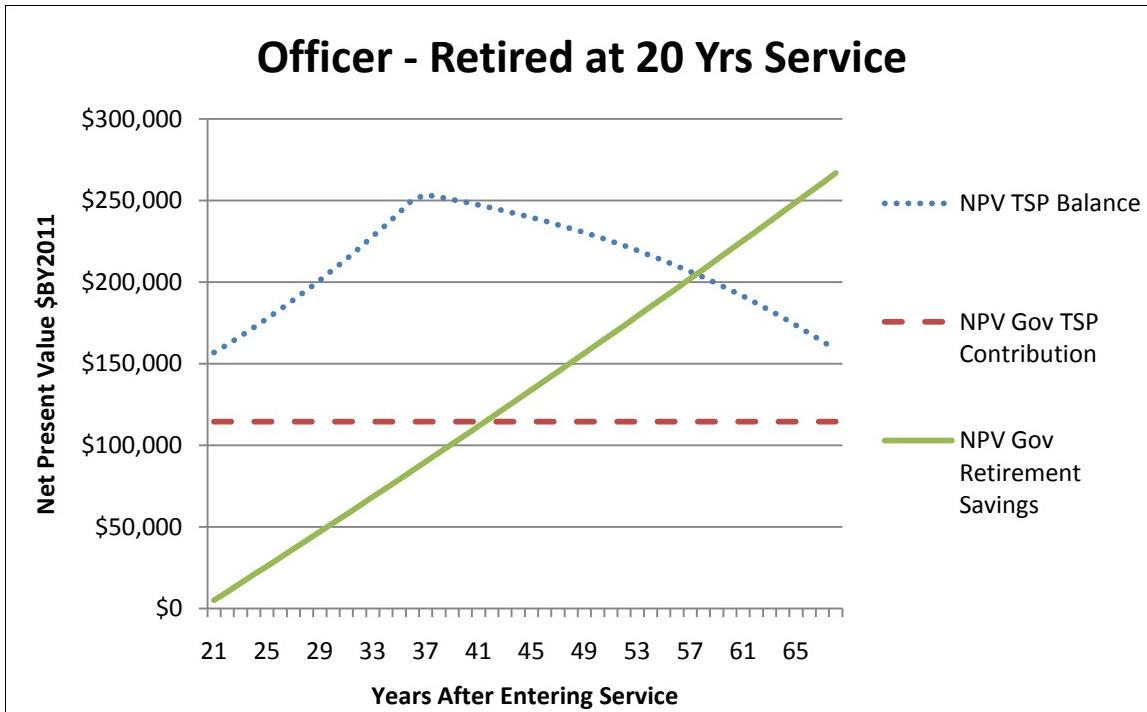


Figure 16. Officer - Retired at 20 Yrs of Service

Table 31. Officer - Retired at 20 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
21	\$156,860.64	\$114,646.25	\$5,163.59
22	\$161,828.30	\$114,646.25	\$10,343.28
23	\$166,953.27	\$114,646.25	\$15,539.13
24	\$172,240.55	\$114,646.25	\$20,751.17
25	\$177,695.28	\$114,646.25	\$25,979.47
26	\$183,322.75	\$114,646.25	\$31,224.07
27	\$189,128.44	\$114,646.25	\$36,485.03
28	\$195,117.99	\$114,646.25	\$41,762.39
29	\$201,297.22	\$114,646.25	\$47,056.20
30	\$207,672.15	\$114,646.25	\$52,366.52
31	\$214,248.96	\$114,646.25	\$57,693.40
32	\$221,034.06	\$114,646.25	\$63,036.90
33	\$228,034.04	\$114,646.25	\$68,397.05
34	\$235,255.70	\$114,646.25	\$73,773.92
35	\$242,706.06	\$114,646.25	\$79,167.55
36	\$250,392.37	\$114,646.25	\$84,578.00

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
37	\$253,653.55	\$114,646.25	\$90,005.32
38	\$252,184.76	\$114,646.25	\$95,449.57
39	\$250,639.84	\$114,646.25	\$100,910.79
40	\$249,016.26	\$114,646.25	\$106,389.04
41	\$247,311.45	\$114,646.25	\$111,884.38
42	\$245,522.75	\$114,646.25	\$117,396.85
43	\$243,647.40	\$114,646.25	\$122,926.51
44	\$241,682.56	\$114,646.25	\$128,473.41
45	\$239,625.32	\$114,646.25	\$134,037.60
46	\$237,472.64	\$114,646.25	\$139,619.15
47	\$235,221.41	\$114,646.25	\$145,218.10
48	\$232,868.42	\$114,646.25	\$150,834.51
49	\$230,410.34	\$114,646.25	\$156,468.44
50	\$227,843.76	\$114,646.25	\$162,119.93
51	\$225,165.14	\$114,646.25	\$167,789.04
52	\$222,370.83	\$114,646.25	\$173,475.83
53	\$219,457.09	\$114,646.25	\$179,180.36
54	\$216,420.02	\$114,646.25	\$184,902.67
55	\$213,255.64	\$114,646.25	\$190,642.83
56	\$209,959.79	\$114,646.25	\$196,400.88
57	\$206,528.24	\$114,646.25	\$202,176.89
58	\$202,956.58	\$114,646.25	\$207,970.91
59	\$199,240.27	\$114,646.25	\$213,782.99
60	\$195,374.64	\$114,646.25	\$219,613.20
61	\$191,354.86	\$114,646.25	\$225,461.59
62	\$187,175.95	\$114,646.25	\$231,328.22
63	\$182,832.77	\$114,646.25	\$237,213.14
64	\$178,320.01	\$114,646.25	\$243,116.41
65	\$173,632.22	\$114,646.25	\$249,038.09
66	\$168,763.74	\$114,646.25	\$254,978.23
67	\$163,708.75	\$114,646.25	\$260,936.89
68	\$158,461.24	\$114,646.25	\$266,914.14

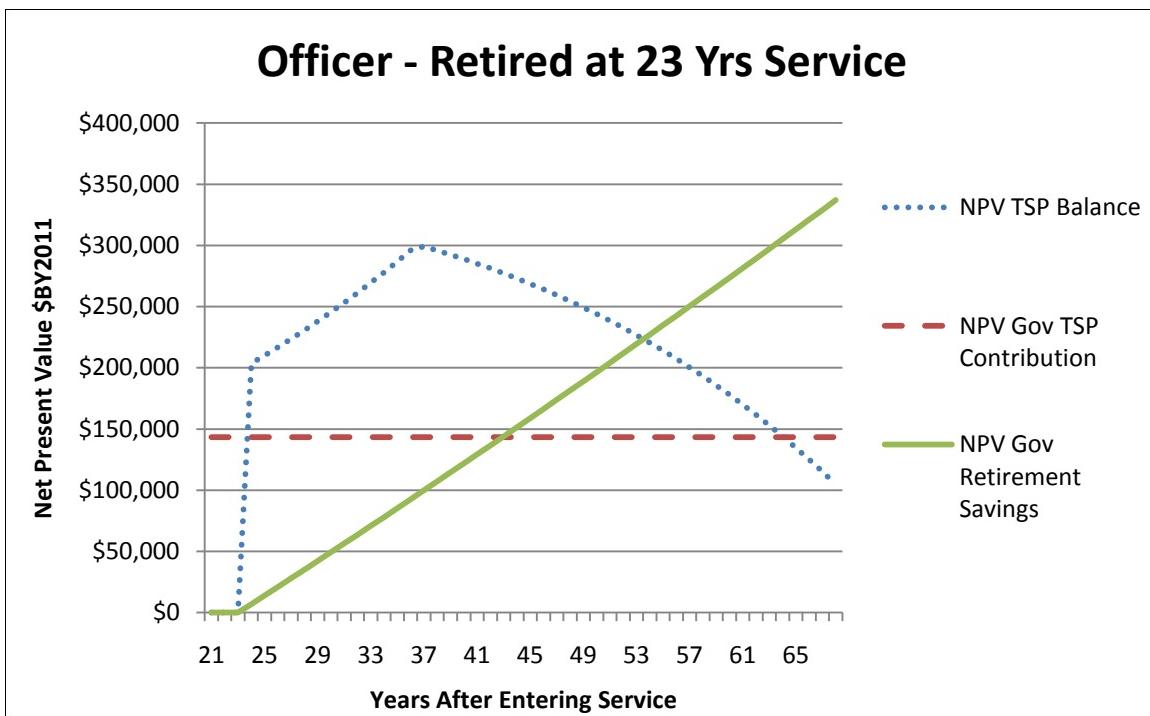


Figure 17. Officer - Retired at 23 Yrs of Service

Table 32. Officer - Retired at 23 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
24	\$203,607.16	\$143,394.42	\$6,987.90
25	\$210,055.25	\$143,394.42	\$13,997.59
26	\$216,707.53	\$143,394.42	\$21,029.13
27	\$223,570.49	\$143,394.42	\$28,082.61
28	\$230,650.79	\$143,394.42	\$35,158.07
29	\$237,955.32	\$143,394.42	\$42,255.60
30	\$245,491.18	\$143,394.42	\$49,375.26
31	\$253,265.70	\$143,394.42	\$56,517.12
32	\$261,286.43	\$143,394.42	\$63,681.25
33	\$269,561.16	\$143,394.42	\$70,867.72
34	\$278,097.96	\$143,394.42	\$78,076.60
35	\$286,905.10	\$143,394.42	\$85,307.96
36	\$295,991.16	\$143,394.42	\$92,561.86
37	\$299,105.74	\$143,394.42	\$99,838.39
38	\$295,838.93	\$143,394.42	\$107,137.60
39	\$292,428.94	\$143,394.42	\$114,459.58

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$288,871.11	\$143,394.42	\$121,804.39
41	\$285,160.63	\$143,394.42	\$129,172.10
42	\$281,292.55	\$143,394.42	\$136,562.78
43	\$277,261.75	\$143,394.42	\$143,976.51
44	\$273,062.95	\$143,394.42	\$151,413.36
45	\$268,690.71	\$143,394.42	\$158,873.39
46	\$264,139.40	\$143,394.42	\$166,356.69
47	\$259,403.23	\$143,394.42	\$173,863.32
48	\$254,476.21	\$143,394.42	\$181,393.36
49	\$249,352.19	\$143,394.42	\$188,946.88
50	\$244,024.78	\$143,394.42	\$196,523.95
51	\$238,487.42	\$143,394.42	\$204,124.65
52	\$232,733.33	\$143,394.42	\$211,749.05
53	\$226,755.52	\$143,394.42	\$219,397.23
54	\$220,546.77	\$143,394.42	\$227,069.25
55	\$214,099.65	\$143,394.42	\$234,765.20
56	\$207,406.47	\$143,394.42	\$242,485.14
57	\$200,459.31	\$143,394.42	\$250,229.16
58	\$193,249.99	\$143,394.42	\$257,997.32
59	\$185,770.08	\$143,394.42	\$265,789.71
60	\$178,010.89	\$143,394.42	\$273,606.39
61	\$169,963.42	\$143,394.42	\$281,447.45
62	\$161,618.43	\$143,394.42	\$289,312.96
63	\$152,966.35	\$143,394.42	\$297,202.99
64	\$143,997.33	\$143,394.42	\$305,117.63
65	\$134,701.19	\$143,394.42	\$313,056.95
66	\$125,067.44	\$143,394.42	\$321,021.02
67	\$115,085.26	\$143,394.42	\$329,009.93
68	\$104,743.48	\$143,394.42	\$337,023.75

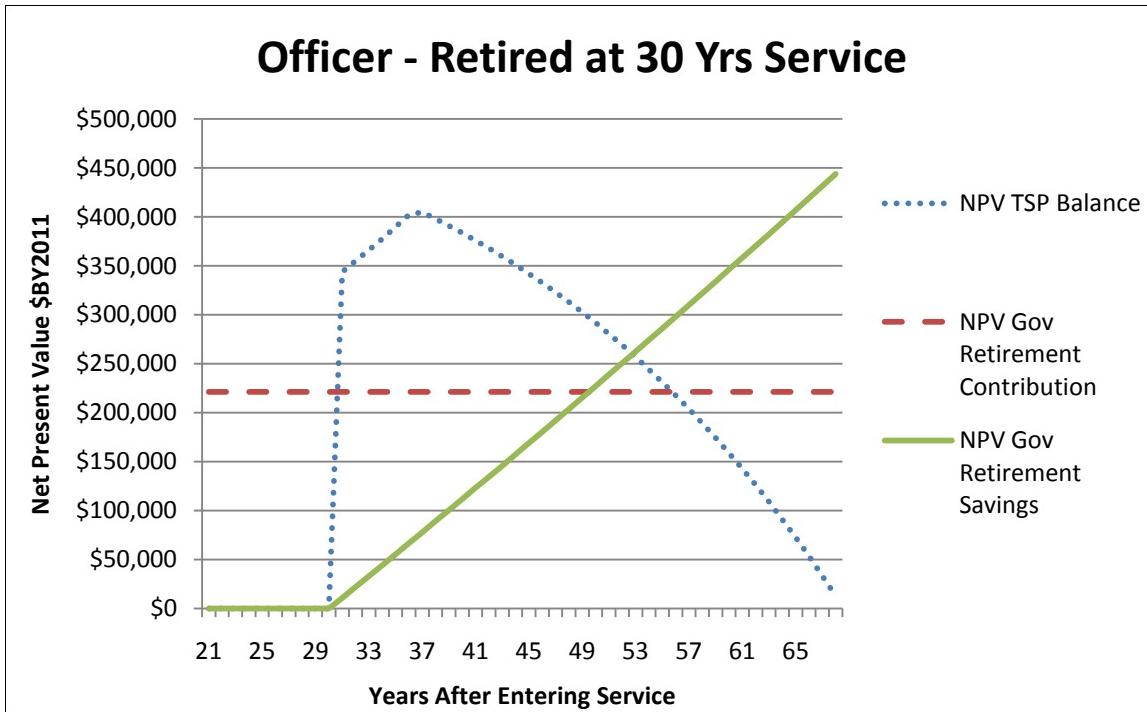
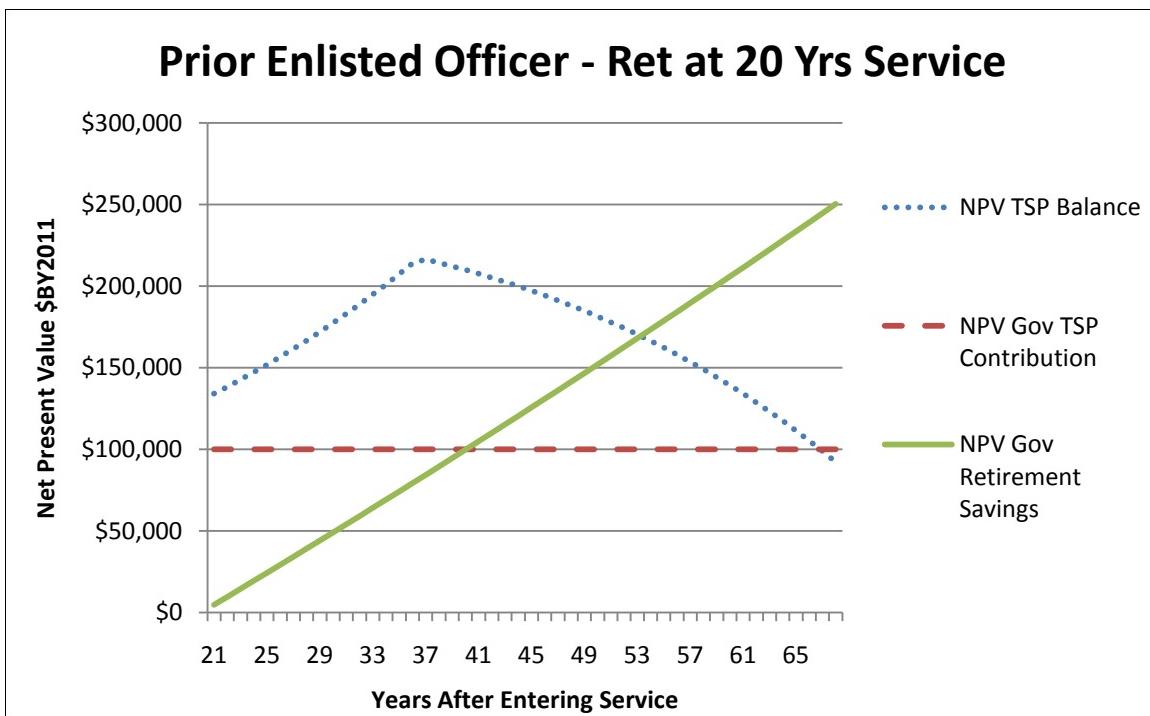


Figure 18. Officer - Retired at 30 Yrs of Service

Table 33. Officer - Retired at 30 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$343,958.88	\$221,432.62	\$11,022.11
32	\$354,851.79	\$221,432.62	\$22,078.58
33	\$366,089.67	\$221,432.62	\$33,169.53
34	\$377,683.45	\$221,432.62	\$44,295.07
35	\$389,644.39	\$221,432.62	\$55,455.29
36	\$401,984.12	\$221,432.62	\$66,650.32
37	\$405,054.71	\$221,432.62	\$77,880.25
38	\$398,221.86	\$221,432.62	\$89,145.20
39	\$391,111.31	\$221,432.62	\$100,445.28
40	\$383,714.07	\$221,432.62	\$111,780.60
41	\$376,020.89	\$221,432.62	\$123,151.26
42	\$368,022.18	\$221,432.62	\$134,557.37
43	\$359,708.09	\$221,432.62	\$145,999.05
44	\$351,068.43	\$221,432.62	\$157,476.41
45	\$342,092.70	\$221,432.62	\$168,989.56
46	\$332,770.05	\$221,432.62	\$180,538.61

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$323,089.31	\$221,432.62	\$192,123.67
48	\$313,038.95	\$221,432.62	\$203,744.86
49	\$302,607.05	\$221,432.62	\$215,402.28
50	\$291,781.34	\$221,432.62	\$227,096.05
51	\$280,549.15	\$221,432.62	\$238,826.29
52	\$268,897.41	\$221,432.62	\$250,593.10
53	\$256,812.62	\$221,432.62	\$262,396.61
54	\$244,280.89	\$221,432.62	\$274,236.92
55	\$231,287.85	\$221,432.62	\$286,114.15
56	\$217,818.69	\$221,432.62	\$298,028.42
57	\$203,858.13	\$221,432.62	\$309,979.83
58	\$189,390.41	\$221,432.62	\$321,968.52
59	\$174,399.27	\$221,432.62	\$333,994.59
60	\$158,867.92	\$221,432.62	\$346,058.15
61	\$142,779.05	\$221,432.62	\$358,159.34
62	\$126,114.81	\$221,432.62	\$370,298.25
63	\$108,856.76	\$221,432.62	\$382,475.02
64	\$90,985.89	\$221,432.62	\$394,689.76
65	\$72,482.59	\$221,432.62	\$406,942.59
66	\$53,326.62	\$221,432.62	\$419,233.62
67	\$33,497.11	\$221,432.62	\$431,562.98
68	\$12,972.51	\$221,432.62	\$443,930.79



**Figure 19. Prior Enlisted Officer - Retired at 20 Yrs of Service**

**Table 34. Prior Enlisted Officer - Retired at 20 Yrs of Service (\$BY2011)**

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
21	\$134,098.21	\$100,088.42	\$4,843.36
22	\$138,344.99	\$100,088.42	\$9,701.81
23	\$142,726.27	\$100,088.42	\$14,575.42
24	\$147,246.30	\$100,088.42	\$19,464.23
25	\$151,909.48	\$100,088.42	\$24,368.28
26	\$156,720.33	\$100,088.42	\$29,287.62
27	\$161,683.54	\$100,088.42	\$34,222.30
28	\$166,803.93	\$100,088.42	\$39,172.36
29	\$172,086.49	\$100,088.42	\$44,137.87
30	\$177,536.33	\$100,088.42	\$49,118.85
31	\$183,158.77	\$100,088.42	\$54,115.37
32	\$188,959.26	\$100,088.42	\$59,127.47
33	\$194,943.46	\$100,088.42	\$64,155.20
34	\$201,117.16	\$100,088.42	\$69,198.60
35	\$207,486.39	\$100,088.42	\$74,257.73
36	\$214,057.32	\$100,088.42	\$79,332.64

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
37	\$216,457.33	\$100,088.42	\$84,423.37
38	\$214,399.85	\$100,088.42	\$89,529.97
39	\$212,249.42	\$100,088.42	\$94,652.50
40	\$210,003.01	\$100,088.42	\$99,791.00
41	\$207,657.50	\$100,088.42	\$104,945.53
42	\$205,209.65	\$100,088.42	\$110,116.12
43	\$202,656.15	\$100,088.42	\$115,302.84
44	\$199,993.55	\$100,088.42	\$120,505.74
45	\$197,218.31	\$100,088.42	\$125,724.85
46	\$194,326.78	\$100,088.42	\$130,960.24
47	\$191,315.18	\$100,088.42	\$136,211.96
48	\$188,179.63	\$100,088.42	\$141,480.05
49	\$184,916.11	\$100,088.42	\$146,764.57
50	\$181,520.47	\$100,088.42	\$152,065.57
51	\$177,988.45	\$100,088.42	\$157,383.09
52	\$174,315.64	\$100,088.42	\$162,717.20
53	\$170,497.48	\$100,088.42	\$168,067.94
54	\$166,529.28	\$100,088.42	\$173,435.37
55	\$162,406.20	\$100,088.42	\$178,819.53
56	\$158,123.25	\$100,088.42	\$184,220.48
57	\$153,675.26	\$100,088.42	\$189,638.27
58	\$149,056.93	\$100,088.42	\$195,072.96
59	\$144,262.76	\$100,088.42	\$200,524.59
60	\$139,287.09	\$100,088.42	\$205,993.22
61	\$134,124.09	\$100,088.42	\$211,478.90
62	\$128,767.73	\$100,088.42	\$216,981.69
63	\$123,211.78	\$100,088.42	\$222,501.64
64	\$117,449.85	\$100,088.42	\$228,038.80
65	\$111,475.30	\$100,088.42	\$233,593.23
66	\$105,281.32	\$100,088.42	\$239,164.97
67	\$98,860.85	\$100,088.42	\$244,754.09
68	\$92,206.64	\$100,088.42	\$250,360.64

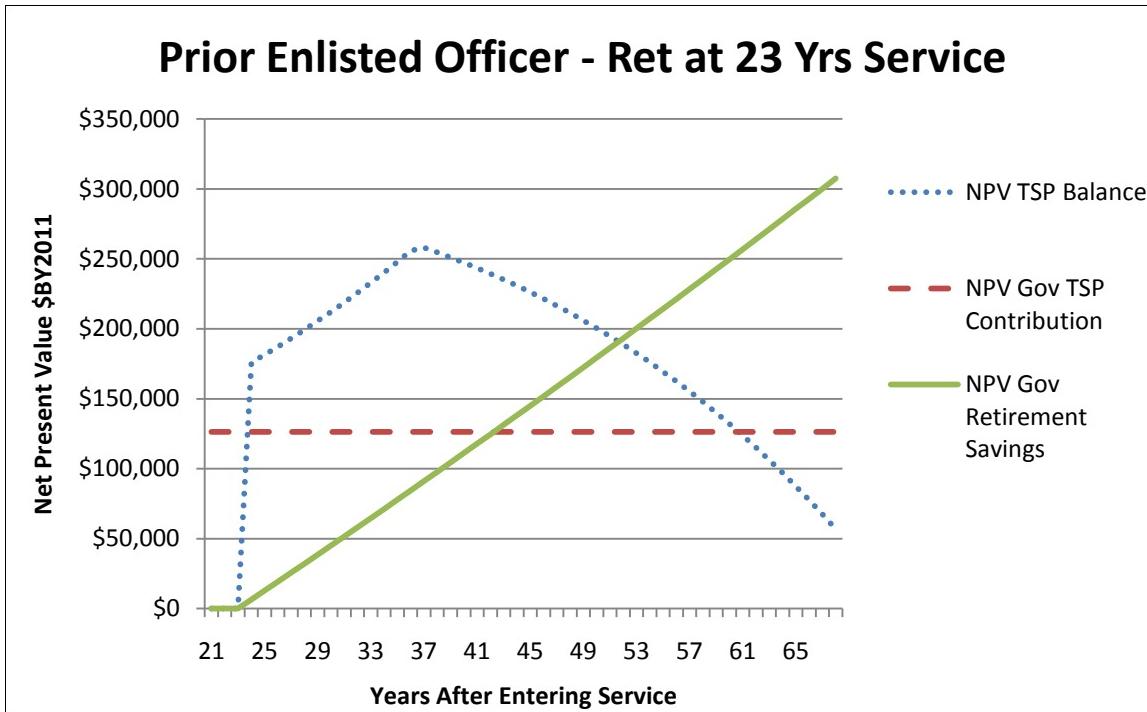


Figure 20. Prior Enlisted Officer - Retired at 23 Yrs of Service

Table 35. Prior Enlisted Officer - Retired at 23 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
24	\$175,938.80	\$126,351.03	\$6,376.82
25	\$181,510.64	\$126,351.03	\$12,773.51
26	\$187,258.94	\$126,351.03	\$19,190.16
27	\$193,189.29	\$126,351.03	\$25,626.81
28	\$199,307.44	\$126,351.03	\$32,083.54
29	\$205,619.36	\$126,351.03	\$38,560.40
30	\$212,131.16	\$126,351.03	\$45,057.45
31	\$218,849.19	\$126,351.03	\$51,574.76
32	\$225,779.97	\$126,351.03	\$58,112.40
33	\$232,930.25	\$126,351.03	\$64,670.42
34	\$240,306.97	\$126,351.03	\$71,248.89
35	\$247,917.30	\$126,351.03	\$77,847.88
36	\$255,768.65	\$126,351.03	\$84,467.44
37	\$258,156.77	\$126,351.03	\$91,107.64
38	\$254,707.18	\$126,351.03	\$97,768.54
39	\$251,112.08	\$126,351.03	\$104,450.22

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
40	\$247,366.77	\$126,351.03	\$111,152.73
41	\$243,466.37	\$126,351.03	\$117,876.15
42	\$239,405.86	\$126,351.03	\$124,620.52
43	\$235,180.05	\$126,351.03	\$131,385.93
44	\$230,783.60	\$126,351.03	\$138,172.43
45	\$226,210.98	\$126,351.03	\$144,980.10
46	\$221,456.50	\$126,351.03	\$151,808.99
47	\$216,514.28	\$126,351.03	\$158,659.17
48	\$211,378.27	\$126,351.03	\$165,530.72
49	\$206,042.21	\$126,351.03	\$172,423.69
50	\$200,499.65	\$126,351.03	\$179,338.16
51	\$194,743.93	\$126,351.03	\$186,274.19
52	\$188,768.18	\$126,351.03	\$193,231.84
53	\$182,565.32	\$126,351.03	\$200,211.19
54	\$176,128.04	\$126,351.03	\$207,212.31
55	\$169,448.80	\$126,351.03	\$214,235.25
56	\$162,519.80	\$126,351.03	\$221,280.10
57	\$155,333.04	\$126,351.03	\$228,346.91
58	\$147,880.21	\$126,351.03	\$235,435.75
59	\$140,152.78	\$126,351.03	\$242,546.70
60	\$132,141.93	\$126,351.03	\$249,679.83
61	\$123,838.56	\$126,351.03	\$256,835.20
62	\$115,233.29	\$126,351.03	\$264,012.87
63	\$106,316.44	\$126,351.03	\$271,212.94
64	\$97,078.01	\$126,351.03	\$278,435.45
65	\$87,507.71	\$126,351.03	\$285,680.48
66	\$77,594.89	\$126,351.03	\$292,948.10
67	\$67,328.58	\$126,351.03	\$300,238.39
68	\$56,697.48	\$126,351.03	\$307,551.41

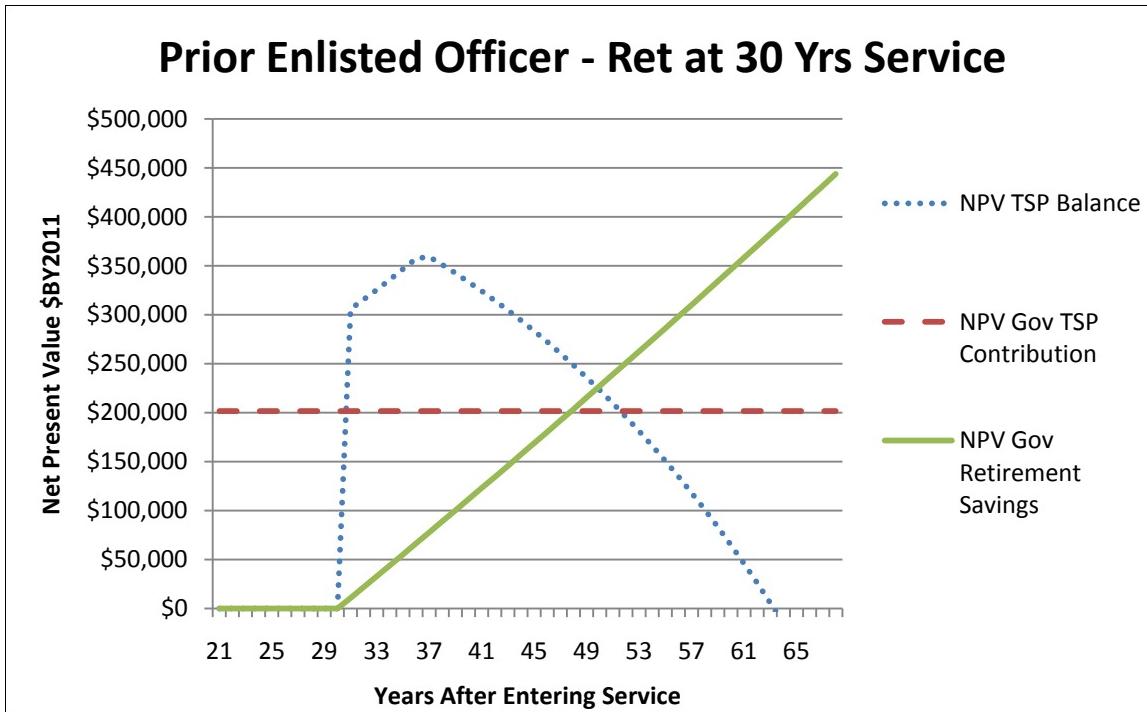


Figure 21. Prior Enlisted Officer - Retired at 30 Yrs of Service

Table 36. Prior Enlisted Officer - Retired at 30 Yrs of Service (\$BY2011)

Year	NPV	NPV Gov	NPV Gov
	TSP Balance	TSP Cont	Ret Savings
31	\$306,029.61	\$201,591.24	\$11,022.11
32	\$315,721.33	\$201,591.24	\$22,078.58
33	\$325,719.98	\$201,591.24	\$33,169.53
34	\$336,035.28	\$201,591.24	\$44,295.07
35	\$346,677.25	\$201,591.24	\$55,455.29
36	\$357,656.25	\$201,591.24	\$66,650.32
37	\$359,323.01	\$201,591.24	\$77,880.25
38	\$351,041.87	\$201,591.24	\$89,145.20
39	\$342,437.16	\$201,591.24	\$100,445.28
40	\$333,498.46	\$201,591.24	\$111,780.60
41	\$324,214.98	\$201,591.24	\$123,151.26
42	\$314,575.62	\$201,591.24	\$134,557.37
43	\$304,568.92	\$201,591.24	\$145,999.05
44	\$294,183.04	\$201,591.24	\$157,476.41
45	\$283,405.80	\$201,591.24	\$168,989.56
46	\$272,224.58	\$201,591.24	\$180,538.61

	<b>NPV</b>	<b>NPV Gov</b>	<b>NPV Gov</b>
<b>Year</b>	<b>TSP Balance</b>	<b>TSP Cont</b>	<b>Ret Savings</b>
47	\$260,626.42	\$201,591.24	\$192,123.67
48	\$248,597.90	\$201,591.24	\$203,744.86
49	\$236,125.20	\$201,591.24	\$215,402.28
50	\$223,194.07	\$201,591.24	\$227,096.05
51	\$209,789.77	\$201,591.24	\$238,826.29
52	\$195,897.13	\$201,591.24	\$250,593.10
53	\$181,500.49	\$201,591.24	\$262,396.61
54	\$166,583.68	\$201,591.24	\$274,236.92
55	\$151,130.02	\$201,591.24	\$286,114.15
56	\$135,122.33	\$201,591.24	\$298,028.42
57	\$118,542.84	\$201,591.24	\$309,979.83
58	\$101,373.26	\$201,591.24	\$321,968.52
59	\$83,594.68	\$201,591.24	\$333,994.59
60	\$65,187.62	\$201,591.24	\$346,058.15
61	\$46,131.97	\$201,591.24	\$358,159.34
62	\$26,406.98	\$201,591.24	\$370,298.25
63	\$5,991.26	\$201,591.24	\$382,475.02
64	-\$15,137.27	\$201,591.24	\$394,689.76
65	-\$37,001.41	\$201,591.24	\$406,942.59
66	-\$59,624.65	\$201,591.24	\$419,233.62
67	-\$83,031.24	\$201,591.24	\$431,562.98
68	-\$107,246.20	\$201,591.24	\$443,930.79

## **Appendix E: Blue Dart**

### **Alternative Active Duty Military Retirement Plan is a Win-Win for Government and Retirees**

The federal government is facing ever-increasing costs, and the Department of Defense (DoD) is no exception. The United States military is in the midst of pricey Overseas Contingency Operations, and must find ways to cut costs and still perform the mission. One of the largest annual expenditures is for military personnel costs. This research outlines a combined defined contribution and defined benefit retirement plan that may help to generate substantial savings for the government while providing an equal or better monetary benefit to retired active duty members. The DoD could save an estimated \$1.7B each year by implementing this new system.

Under the current High-36 retirement system selected by most active duty members, the monthly basic pay from the highest 36 months' pay of active duty service is averaged and paid each month immediately after retirement. A retired service member is eligible to retire after 20 years of service, and receives 2.5% of the average basic pay for each year of service. The monthly payment is adjusted by a cost of living adjustment each year to keep up with inflation.

Under the alternative retirement plan described in this research, retirees would receive monthly Thrift Savings Plan (TSP) contributions equal to 7.5% of the current basic pay rate during active duty service time. Members would not be required to match the contributions, and would not receive any benefits if they separate before 20 years of service. Upon 20 years of service, the members would be able to begin withdrawing

contributions from the TSP. The money would be invested into the TSP G fund, which is the most conservative fund, but is guaranteed by the federal government not to lose money. Due to the compounding nature of interest, the TSP account would grow each month while the member is serving on active duty.

The amount of retirement they would receive from the government is reduced to 90% of what would have been paid under the High-36 system. If monthly TSP withdrawals equal the decrease in monthly benefits directly from the government, the TSP account is able in most cases to provide the member with the same or increased monthly income. The most exciting aspect of the alternative plan is that the government is able to save money at the same time.

Because the retirement plan requires monthly contributions as soon as recruits enter the military, it would not be a possible option for anyone currently serving or already retired. Under the assumption that individuals must wait until age 59 ½ to make withdrawals from the TSP, the same results still hold true that the member could have as much or more money in net present value at an average life expectancy while the government saves money as well. Although the topic does have policy implications, the initial findings for this study are extremely promising and indicate that there may be a win-win position between military retirees and the government.

## **List of Symbols, Abbreviations, and Acronyms**

AFI	Air Force Instruction
AFPC	Air Force Personnel Center
COLA	Cost of Living Adjustment
CPI	Consumer Price Index
CSB	Career Status Bonus
CSRS	Civil Service Retirement System
DoD	Department of Defense
FERS	Federal Employees Retirement System
IDEAS	Interactive Demographic Analysis System
IRA	Individual Retirement Account
NDAA	National Defense Authorization Act
NPV	Net Present Value
QRMC	Quadrennial Review of Military Compensation
Redux	Military Retirement Reform Act of 1986
SSA	Social Security Administration
TSP	Thrift Savings Plan
YOS	Years of Service

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<b>14. ABSTRACT</b> The purpose of this thesis is to explore the monetary effect of implementing an alternative military retirement system for incoming active duty service members who retire after a minimum of 20 years of service. This alternative system combines elements of both a defined contribution plan and a defined benefit plan. Upon entering the military, all members would have a monthly contribution placed into the Thrift Savings Plan (TSP) on their behalf in exchange for a decreased monthly payment from the government upon retirement. The research model is based on case studies of Air Force members using historical data and Monte Carlo simulation. The results include an in-depth sensitivity analysis on various influential factors such as individual career length, inflation, and TSP rate of return. The research indicates that this alternative system may be able to generate substantial cost savings for the government. In addition, results show a likelihood of equal or increased monetary benefits for military members after retirement. The proposed alternative plan supplies a promising combination of retiree benefits and government savings.				
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